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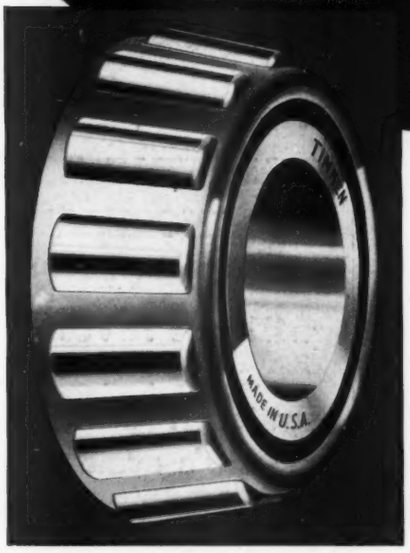

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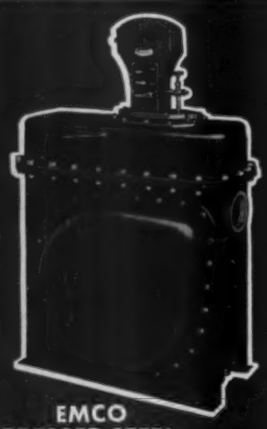

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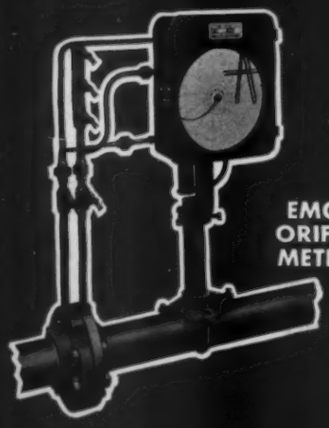

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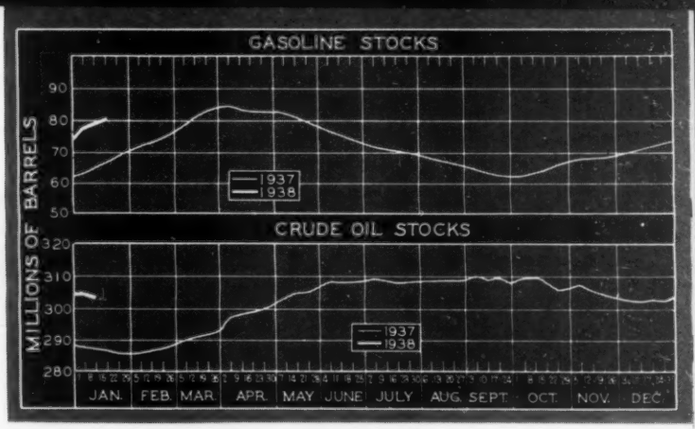


Deeper Cut in Output Is Needed

PRODUCERS should reduce their output 5 per cent below the allowable recommended by the Bureau of Mines, Charles F. Roeser, president of the Independent Petroleum Association of America, told the Interstate Oil Compact Commission, meeting in Oklahoma City Tuesday of this week. Mr. Roeser said the industry produced 45,000,000 more barrels of oil than it should have in 1937, and, urging the commission to adopt corrective measures, he characterized the body as "the doctor of the industry." This meeting of the commission, whose deliberations ordinarily stir little interest outside of Mid-Continent territory, was being watched by the industry generally, and it is expected its recommendations following Tuesday's meeting, will be accepted for guidance more than in the past.

CRUDE PRODUCTION 3,478,886 barrels daily average—up 42,403 barrels.

CRUDE STOCKS 303,078,000 barrels as of January 8—down 390,000 barrels.

GASOLINE STOCKS 80,947,000 barrels as of January 15—up 1,616,000 barrels.

REFINERY RUNS 3,240,000 barrels daily week ending January 15—up 30,000.

Attention was focused this week on steps designed to halt excessive output of both crude and some refined products, particularly gasoline. Conspicuous among these was the action of the Standard Oil Company of New Jersey in slashing its refinery throughput 15,000 barrels daily, at the rate of almost half a million barrels a month and a reduction of approximately 5 per cent. Other large companies were reported considering plans for accomplishing similar objectives.

Indicative of the disposition to join in efforts to stabilize both the crude and the refinery markets is the fact that several large crude purchasers in Kansas have reduced their takings in that state from 70 to 90 per cent of the allowables set by the Kansas Corporation Commission.

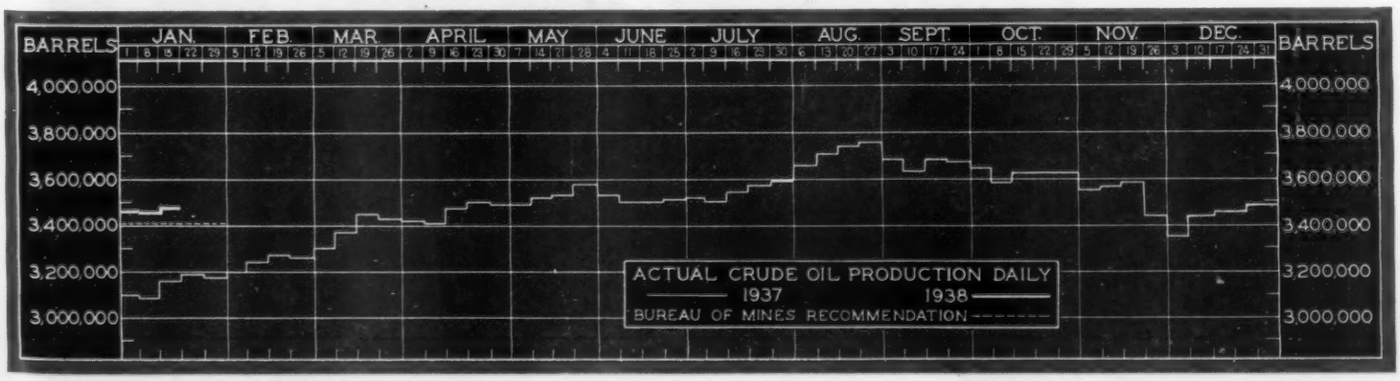
An increase of 42,403 barrels in the daily production of crude throughout the country was made up for the most part of minor increases in Oklahoma, Texas, Louisiana, California, and Kansas. California's production was about 33,000 barrels a day above the recommended allowable of the Bureau of Mines. Most of the other states were either below the bureau recommendation or only slightly above it. Feeling increases, however, that to remedy threatening conditions in the industry it will be necessary, as Mr. Roeser declared at the Oklahoma City meeting, to do better than adhere to bureau recommendations.

Mounting gasoline stocks continued to exert a demoralizing influence on the gasoline market. It becomes increasingly evident that if the industry is not to approach the summer of 1938 burdened with inventories which even a prosperous season cannot possibly absorb, drastic measures will have to be adopted at once.

Daily Average Production for Week

	Jan. 15 1938	Bur. Mines Jan. est.	Jan. state allowables	Jan. 8 1938
Oklahoma City	121,950			120,975
Fitts	73,925			68,850
Remainder of state	347,725			349,000
Total Oklahoma	543,600	566,600	550,000	538,825
East Texas	492,253			492,150
West Texas	198,897			197,699
North Central Texas	104,449			106,297
Texas Panhandle	69,448			61,498
East Central Texas	87,300			86,000
Gulf Coast Texas	328,250			323,000
Southwest Texas	108,903			108,700
Total Texas	1,389,500	1,350,900	1,357,573	1,375,344
North Louisiana	79,485			78,385
Gulf Coast Louisiana	170,100			168,850
Total Louisiana	249,585	238,400	256,000	247,235
California	711,250	678,300	678,300	708,800
Kansas	180,200	179,300	186,472	162,650
Arkansas	41,055	35,200		42,530
Eastern fields	136,900	128,000		133,500
Michigan	50,426	54,100		51,389
New Mexico	107,170	103,100	107,100	107,130
Rocky Mountain area	69,200	72,900		69,080
Total United States	3,478,886	3,406,800		3,436,483

Increase, 42,403 bbls. daily.



SPARKS FROM THE NEWS

TURN ABOUT

Crude oil stocks after increasing 427,000 barrels in two weeks dropped 390,000 barrels in the week ending January 8. Welcome reversal.

THE OTHER SIDE

The large increase in exports, due in part to fears of war in a distressed world, at least helped to save this country from another flood of "distress" gasoline.

AWAKENING

Fancy prices are being asked and paid for leases in the K.M.A. field. Early doubters are now realizing they are a little late.

PRESCRIPTION

President Charles F. Roeser may call the Interstate Compact Commission the "doctor of the industry" but much depends upon whether the patient will take his medicine.

HOPE

Bureau of Mines forecasts February demand for crude at 3,438,200 barrels, or 31,400 barrels more than in January. Optimists will hope the estimate is right.

TWENTY BILLIONS

The twenty-billionth barrel of oil was produced in the United States on January 9. It took 41 years to produce the first billion, but less than 11 months this year to produce another.

TO HIGHEST BIDDER

Texas district court has ordered the sale of 439,000 barrels of confiscated oil held in East Texas. It will be offered at auction and may close an unpleasant chapter in oil history.

HIGH-COST SUBSTITUTE

Advocates of benzol as a motor fuel have seen its cost rise to double that of gasoline. Stocks of the material already are low, and with curtailed operation of the steel plants which make it, further reduction of output is certain.

NOT WORRIED

One of the matters to be discussed with business leaders in White House conferences is the proposal that patent rights extend less than the present 20-year period. This will not worry refinery research and development departments greatly, for most of their processes and equipment becomes obsolete in less time.

ON THE EDGE OF A BLAZING CRATER

Drag line pulling out mud and derrick sections at burning gas well, La Blanca, Tex., while two water lines keep equipment cool

Constant Gain in Burning Oil Use

By H. STANLEY NORMAN

NEW YORK, Jan. 17.—Total domestic demand and export business in gas oil and distillate fuel, including kerosene, for 1937 was in the neighborhood of 205,000,000 bbls. Residual fuel oil consumption plus exports reached at least 335,000,000 bbls.

Domestic consumption of gas oil and distillate fuels at the end of November stood at 101,547,000 bbls., an increase of 13.75 per cent over the 89,302,000 bbls. for the same period in 1936. In gas oil and fuel oil exports, however, the first 11 months show a much higher percentage of increased demand. From January through November, gas oil and distillate fuel oil exports totaled 28,003,000 bbls., a gain of about 53 per cent compared to 18,402,000 bbls. in the same period in 1936.

The current position of all classes of fuel oil and the prospects for the winter take on new interest in view of the present recession in general business. In the opinion of most observers, the recession is, so far, too moderate to have any protracted influence on domestic demand, although residual fuel consumption has suffered by curtailment of business. Because of close relationship with manufacturing, shipping, railroad operations and public utility power plant production, the heavy fuels probably are more dependent on general business conditions than most other petroleum products. The fact that steel mills are operating on reduced schedules and that automobile manufacturers are also reducing their production schedules has cut rather deeply into heavy fuel oil consumption during the past few weeks.

Domestic demand for gas oil and distillate fuels almost constantly increased throughout 1937. February, an exceedingly cold month in 1936, is the only month of 1937 on which statistics are complete in which domestic demand fell below the preceding year. In all other months through October the domestic demand was up.

There has been no exception to the general increase of export demand for gas oil and distillate fuel compared with 1936. In this connection there is fear that export demand may taper off either in 1938 or 1939 due to the fact that large quantities were purchased abroad for the purpose of filling military storage facilities. The export market will depend this year on how much further foreign countries deem it necessary to prepare for emergencies.

With an extensive naval construction program finding favor at Washington, it is expected by some that any decline in export demand for fuel oil will be more than absorbed by the government's purchases.

An examination of gas oil and distillate fuel oil stocks in this country at the end of October has given some cause for concern. Distillate oil burner shipments for the first 11 months totaled 452,633 units, meaning a good percentage of that number will be in service this winter that did not figure in last winter's consumption, excepting replacements. Gas oil and distillate fuel oil stocks at the end of November totaled 26,852,000 bbls. or 438,000 bbls. more than at the same time in 1936.

Mild temperatures prevailing in the burning oil consuming areas during October coupled with sharp increases in production by refineries continued the trend of stocks upward. In the preceding October distillate fuel oil stocks started their downward trend for the winter in October. In the absence of complete details, it is evident distillate fuel oil stocks were drawn upon in November and December, but not to the extent the industry would have experienced had temperatures dropped to normal.

It seems probable that, for the third consecutive year, sales of heating oils and range oil will reach a new high level, and in the lighter brackets may cause a shift in summer-time refinery operations to meet the requirements of next winter.

Extent of alterations in cracking operations will be determined only by severity of the winter. Despite the fact sound conservation practice might disapprove of burning distillate, which if run to cracking stills would yield another substantial cut of motor fuel, refiners will probably do just that to the extent the demand requires. For, even though a greater profit might be realized by maximum cracking operation, the demand and market for distillate fuels is sufficient to net a reasonable margin above the cost of crude, of course with value also assigned to the other products of distillation.

Troughs and peaks in the distillate fuel oil market probably will be leveled out somewhat and perhaps to an increasing degree this year and in those to follow. Several companies are now arranging storage facilities at points of consumption so that fuel oil material may be moved out of the refining centers as it becomes available in the season of slack demand. In this way, not only will the fuel oil market be put on a more stable basis, but the past practice of selling surplus production in the summer to distributors at the low of the market and purchasing in the open market at top prices the following winter will be eliminated.

This is one of the first winters in which oil companies producing fuel oil have based their market on a cost plus basis. In other words, the market in the north Atlantic Coastal district is now based on the Gulf Coast cargo price, plus transportation and plus margins for handling and for profit.

Fuel oil departments of the large companies feel there is still room for improvement in making the product self-sustaining, but the improvement over previous conditions is said to be en-

Loading

●

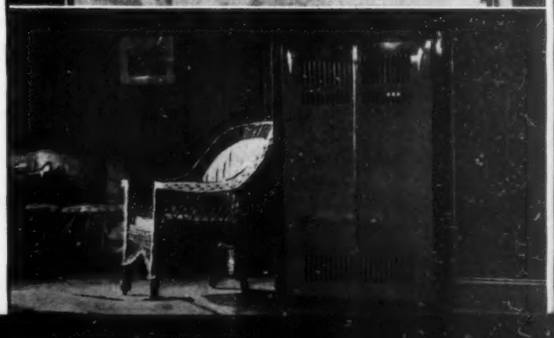
Delivery

●

Receipt

●

Extra room in basement



couraging. This changed attitude toward fuel oil is also partially responsible for addition of facilities for storing large quantities of fuel oil at the points of consumption over the summer against the succeeding winter's demand.

Severe cold weather with the mercury dipping to or near the zero mark is needed in this section to produce a maximum amount of activity in the fuel oil market. Temperatures have been considerably above the 50-year average for this season. If moderate winter prevails through March, there is no fear distillate fuel oil stocks will prove inadequate, although the surplus above operating requirements will be slight at the end of the season. On the other hand, a change to below normal temperatures for the next 60 or 90 days will produce a tightness probably never before experienced.

Heating Oil Sales

In a recent review of heating oil sales for 1936 issued by the petroleum economics division of the Bureau of Mines, it was revealed that 69,429,000 bbls. of fuel oil, ranging in grade from No. 1 to No. 4, were sold in the United States for building heating purposes. The figures are subject to correction, the report says, since reporting oil companies are frequently unable to differentiate between light fuel oils used for domestic oil burning, diesel fuel, tractor fuel and general industrial purposes. The survey indicated that residual fuel, represented in the report by grades No. 5 and No. 6, was used for heating to the extent of 29,828,000 bbls.

A long advocated movement for simplification of fuel oil classifications is gaining headway and have been submitted to the A.S.T.M. committee D-2 for action in Detroit at its session this month. In practice, at least two of the grades have been eliminated on the Atlantic Coast by refiners. In this area there is no distinction between No. 1 fuel oil and kerosene. Furthermore, educational programs have just about eliminated No. 4 grade. Even greater simplification is sought by some leaders in the industry and members of the A.S.T.M. technical subcommittee E on classification of fuel oils are now being polled by mail to determine if three grades of fuel oil will be sufficient.

The regional breakdown of 1936 oil sales for heating buildings indicates the Middle Atlantic states (New York, New Jersey, Pennsylvania, Delaware, Maryland and the District of Columbia) constitute the most important market for heating oils and that this area accounted for nearly 39,000,000 bbls. of the consumption, a quantity equal to 39.4 per cent of the national demand. The North Central group of states (North Dakota, South Dakota, Minnesota, Nebraska, Iowa, Wisconsin, Illinois, Indiana, Michigan, Ohio, Kentucky and Tennessee) wherein are located a number of important urban centers of population, such as Chicago, Detroit, St. Louis, Minneapolis and Kansas City, ranks second as a consuming area for heating oils. Sales of heating oils in these states increased from 19,730,000 bbls. in 1935 to 27,015,000 bbls. in 1936. The latter total is 27.2 per cent of all heating oil sales for the year, compared with 25.7 per cent in 1935.

The New England states stand third as a market for heating oils, requiring 17,506,000 bbls. in 1936, compared with 14,040,000 bbls. in 1935. The remaining regions, South Central, Pacific Coast, South Atlantic and Rocky Mountain are of less importance as consuming areas for heating oils and rank in requirements in the above order.

It is evident from the Bureau of Mines survey that approximately a third of gas oil and distillate fuels were consumed for purposes other than heating. Range oil consumption in 1936 totaled 27,292,000 bbls. which was not considered in the light heating oil total sales figure of 69,429,000 bbls. While a part of the range oil consumption is kerosene, and considered separate, a part of it no doubt consists of gas oil and distillate fuel as segregated in other Bureau of Mines reports. It probably would fall within reasonable limits to assume that about 25 per cent of the total 1936 domestic demand for gas oil and distillate fuel was used for purposes other than burning for heating purposes. While part of the 25 per cent of total domestic demand thereby may be subject to decline along with general business, it is established that the increased demand for diesel fuel and tractor fuel would more than compensate for the shrinkage of consumption by industrial users.

THIRD QUARTER POSITION OF FUEL OILS

	Gas oil and distillate		Fuel oil	Residual fuel oil		
	Domestic demand	Export shipments	stocks on hand	Domestic demand	Export demand	Stocks on hand
January, 1937	14,856,000	2,168,000	19,088,000	28,039,000	1,401,000	83,276,000
January, 1936	*11,764,000*	*1,335,000*	*17,418,000*	*26,918,000*	*1,661,000*	*83,083,000*
February, 1937	10,572,000	1,511,000	18,211,000	27,311,000	715,000	80,571,000
February, 1936	*11,881,000*	*1,340,000*	*15,322,000*	*26,251,000*	*1,334,000*	*81,563,000*
March, 1937	10,800,000	1,925,000	16,724,000	29,682,000	1,359,000	78,435,000
March, 1936	*8,414,000*	*1,424,000*	*15,746,000*	*25,782,000*	*1,159,000*	*80,870,000*
April, 1937	8,171,000	2,511,000	16,889,000	27,709,000	1,450,000	77,318,000
April, 1936	*6,842,000*	*1,426,000*	*17,031,000*	*24,702,000*	*1,025,000*	*80,725,000*
May, 1937	6,806,000	2,790,000	18,451,000	25,729,000	1,254,000	79,158,000
May, 1936	*4,858,000*	*2,432,000*	*19,910,000*	*24,114,000*	*1,213,000*	*82,085,000*
June, 1937	6,295,000	2,633,000	20,657,000	26,060,000	1,183,000	81,224,000
June, 1936	*5,145,000*	*1,857,000*	*22,475,000*	*24,330,000*	*922,000*	*82,223,000*
July, 1937	6,614,000	3,090,000	23,637,000	25,849,000	1,258,000	84,154,000
July, 1936	*6,139,000*	*1,845,000*	*24,814,000*	*23,520,000*	*700,000*	*83,907,000*
August, 1937	7,197,000	3,046,000	25,952,000	26,259,000	1,256,000	86,420,000
August, 1936	*6,178,000*	*1,652,000*	*27,645,000*	*23,474,000*	*1,111,000*	*85,204,000*
September, 1937	9,482,000	2,956,000	27,020,000	26,544,000	1,197,000	89,007,000
September, 1936	*8,238,000*	*1,631,000*	*27,871,000*	*25,913,000*	*1,211,000*	*84,746,000*
October, 1937	9,957,000	2,547,000	28,101,000	26,847,000	1,187,000	92,182,000
October, 1936	*8,712,000*	*1,864,000*	*27,659,000*	*27,301,000*	*632,000*	*85,281,000*
November, 1937	11,639,000	2,826,000	26,852,000	26,057,000	2,073,000	93,225,000
November, 1936	*11,131,000*	*1,596,000*	*26,414,000*	*24,892,000*	*2,039,000*	*85,091,000*
Eleven months, 1937	101,547,000	28,003,000	26,852,000	296,801,000	14,333,000	93,225,000
Eleven months, 1936	*89,302,000*	*18,402,000*	*26,414,000*	*277,197,000*	*12,957,000*	*85,091,000*
Increase, 1937	12,245,000	9,601,000	438,000	19,604,000	1,376,000	8,314,000
December, 1937	.....	.....	.....	.....	.....	.....
December, 1936	*14,160,000*	*1,482,000*	*22,719,000*	*28,332,000*	*1,439,000*	*84,199,000*
Total 1936	*103,462,000*	*19,882,000*	.....	*305,529,000*	*14,396,000*	.....

In the accompanying table data on domestic demand, exports and stocks for both gas oil and distillate fuel and for residual fuel are shown for each month in the first three quarters of 1936 and 1937 with the former extended to include the last three months of the year. The standing at the end of nine months may give a clue to the October cut of 10 cents per barrel at most points on Bunker C fuel oil. The table shows residual fuel oil stocks climbed to a new high for the periods under consideration at the end of September. It also shows heavy oil stocks on October 31 totaling 92,182,000 bbls., were 6,901,000 bbls. greater than on the same date in 1936.

Gasoline consumption continued through December approximately 10 per cent higher this year and combined domestic and export demand for gas oil and distillate fuel is up about 18 per cent. The combination of conditions is producing a disproportionate burden on residual fuel oil stocks in view of the small increase in demand. Domestic demand for residual fuel oil during the first 11 months was up 19,604,000 bbls. to 296,801,000 bbls. for the period, a gain of 8 per cent. Exports of residual fuel oil increased 7 per cent, but the heavier manufacturing schedules to meet demand for the lighter products could not but add to the residual stocks when consumption of the latter was increasing at a more moderate rate.

U.S.S.R. Exports Continue At a Reduced Level

The low level of U.S.S.R. petroleum exports continued at the reduced level through November, 1937, when shipments totaled 96,380 long tons. Petroleum shipments for the first 11 months of 1937 were 1,417,924 tons compared to 2,308,457 tons for the same period in 1936. For November, 1936, the U.S.S.R. exported 140,963 tons showing last year's shipments for that month to have dropped about 31 per cent. For 11 months of 1936, the petroleum exported by U.S.S.R. totaled 2,308,457 tons.

A bulk of Russian oil shipments for the first 11 months of 1937 consisted of fuel oil and gasoline with lubricating oil and kerosene trailing in that order. Fuel oil exports accounted for 684,180 tons of the total; gasoline shipments amounted to 367,121 tons; lubricating oil to 208,478 tons and kerosene to 158 145 tons.

Petroleum Freight Rate Ruling on Montana Shipments

The Interstate Commerce Commission has granted authority for establishment of lower rates on petroleum products, carloads, from Billings and Laurel, Mont., to destinations in North and South Dakota and Minnesota over the lines of the Great Northern and Northern Pacific railways. The decision followed complaint by corporations operating refineries at Billings and Laurel that the rates were unreasonable and unduly preferential of refiners in the Mid-Continent field and Wyoming.

The decision of the ICC authorizes the establishment to St. Paul, Duluth, and points in intermediate territory of a rate not exceeding 57.5 cents per 100 pounds, or the same as that already established by the Burlington via the southern gateways to St. Paul. It also provides for establishment of lower rates where warranted to additional groups of main line points in intermediate territory, namely 55, 50, and 48 cents per 100 pounds east to west as far as points near the Montana line to which mountain-Pacific scale rates of 48 cents per 100 pounds and less are applicable. The new rates to International Falls, Minn., and intermediate points north of Bemidji, Minn., will reflect amounts over the rate of 57.5 cents to Bemidji, and rates to branch line points will reflect amounts over rates to the main line junctions the same as the amounts by which the rates from Casper, Wyo., to the same points exceed the rates to Bemidji and the main line junctions, respectively. The old rate to St. Paul, Duluth, and Bemidji was 71 cents per 100 pounds.

The ICC noted that the marketing of petroleum products in this destination territory is highly competitive and the cost of transportation is an important factor.

Five Per Cent Curtailment in February Output Proposed

By L. G. E. BIGNELL

OKLAHOMA CITY, Okla., Jan. 18. Because of the harmonious relations existing between the regulatory bodies of the several oil producing states and the desire on the part of the majority of the producers to stabilize crude oil production and current demands, Charles F. Roeser, president of the Independent Petroleum Association of America, told the Interstate Oil Compact Commission at its quarterly meeting here today that there should be a curtailment in the allowable in all states during February.

Mr. Roeser pointed out that it seems apparent that there had been the equivalent of 45,000,000 bbls. production of unneeded oil during 1937. This estimate is made up of about 15,000,000 bbls. of crude oil stored and 15,000,000 bbls. of gasoline which, based on a 50 per cent yield, would be the equivalent of 30,000,000 bbls. of stock. It is therefore suggested there should be a cut of about 5 per cent below the Bureau of Mines recommendations for February by all of the states which will help to adjust the present market situation.

Later, in an interview, Col. Ernest O. Thompson, chairman of the Interstate Oil Compact Commission, expressed the opinion that this adjustment would be made between the various states without difficulties.

Walter L. Jones representing Governor Earle of Pennsylvania stated that because of the high rate of production maintained in the fields of that state the governor has intimated that if operators did not voluntarily cut back production to market demands it would fall upon the state officials to take some definite action to bring this reduction about. Prices have been cut in Pennsylvania recently because of overproduction and in the past such cuts have usually acted as mediums for regulating rate of production.

Marvin Lee Resigns

Marvin Lee, former technical adviser to the Kansas Corporation Commission, who has resigned from that position effective February 1 to enter private practice, also tendered his resignation as a member of the committee on the codification of state laws governing production of oil and gas. He recommended this work be continued and that the commission furnish funds to carry it on. In accepting this resignation Chairman Blincoe of the Kansas Commission paid high tribute to the work done by Mr. Lee in his several capacities both as adviser for the Kansas regulatory body and on the committee of the Interstate Oil Compact Commission.

Tom Anglin, assistant representative for Oklahoma, presented a statement prepared by Art L. Walker, secretary for the Interstate Oil Compact Commission, showing Bureau of Mines monthly forecast and production reports for the period of September, 1935, to November, 1937, inclusive. Each state's actual production figure is compared with the allowables as set and the overage or underage is expressed in per cent. For this period of more than two years the figures indicate that the six principal producing states would have come nearer to having met current crude oil demand had Bureau of Mines recommendations been more closely followed.

As an example the accompanying table shows what happened during the 11 months of 1937 for which final reports are available.

Average Production, Allowable, and Overage for six principal oil producing states, January to November, 1937 inclusive.

State—	Production	Allowable	Overage	Per cent
Texas, 1937 average	1,404,609	1,332,381	+72,227	5.42
California, 1937 average	648,427	604,027	+44,400	7.36
Oklahoma, 1937 average	633,436	611,471	+20,872	3.40
Louisiana, 1937 average ..	248,463	243,836	+ 4,536	1.86
Kansas, 1937 average ...	195,281	187,363	+ 7,912	4.22
New Mexico, 1937 average	160,054	96,090	+ 9,963	10.30

Mr. Anglin also offered the editorial published in the January 6 issue of The Oil and Gas Journal entitled "Real Purpose" to be incorporated into the minutes of the meeting as expressing problems which the commission should seriously consider and act upon in order that some of its original objectives might be accomplished.

Engineers Present Papers

As a diversion from the usual routine business of the commission two discussions by engineers on enforced conservation measures were presented by E. V. Cottingham of the engineering department of the Oil and Gas Division of the Texas Railroad Commission and M. L. Haider of the production engineering department of the Carter Oil Co. of Tulsa.

Mr. Cottingham presented graphs, charts and data covering bottom-hole pressures, average daily production and cumulative production for East Texas, Yates, Van, Thompson, Conroe, Hastings and Rodessa (Texas) oil fields. These data indicated the many benefits that have accrued in these various fields following the enforcement of conservation orders issued by the Railroad Commission.

Mr. Haider presented somewhat similar information covering the pressure maintenance work done in the South Burbank oil field in Osage County, Oklahoma. He also showed graphs and charts to illustrate the benefits gained in that field by the maintenance of controlled pressure drop through the injection of residue gas into the producing formation. Both of these discussions were very instructive and show what the industry can do through the aid and cooperation of the various governing bodies in the oil producing states.

Mr. Haider's paper was well received and discussion followed his presentation, during which many interesting facts concerning this project were brought out.

A report on "State Compacts" presented by the special committee on state compacts of the Chamber of Commerce of the United States to the meeting of the board of directors of that organization on March 19, 1937, and recently made available was presented to the compact meeting by Art L. Walker, secretary, and read into the minutes of the meeting. This report is of interest because this special committee points out the benefits that have accrued to the oil industry through the operation of the Interstate Oil Compact Commission and urges similar compacts be set up by the various industries to assist in solving their many problems.

In addition to the meeting of the Interstate Oil Compact Commission the executive committee of the Independent Producers Association of America also held a meeting in Oklahoma City, Okla., on January 18 to transact routine business of that organization.

The meeting was well attended and it was agreed that the next meeting should be held in Wichita, Kans., in May as near the date of the semiannual meeting of the A.P.I. as practicable. The exact date is to be set by the executive committee of the commission.

Many of the representatives of the oil compact states were in Oklahoma City on the day prior to the meeting and several informal gatherings were held at which many of the industry's problems were discussed. The Texas Railroad Commission's meeting at Austin on Monday came in for consideration and interest was expressed in the action that might be taken by that body regarding February allowables. Neither Oklahoma nor Kansas regulatory bodies have set the allowables for their states and the Kansas Corporation Commission has called a hearing for January 26 at which time the allowable for the various fields in that state will be considered. The Oklahoma Corporation Commission will also set the Oklahoma allowable soon. The attitude of the various representatives attending the compact meetings indicates there will be a general cutback of allowables for February to adjust stocks and this should give relief.

Governor E. W. Marland of Oklahoma called attention to the meeting of the governors of the several oil producing states to be held in Hot Springs, Ark., on January 24, at which time it is proposed to discuss the present situation in the oil industry concerning prices.

Standard of New Jersey Cuts Runs 15,000 Barrels Daily

The Standard Oil Co. of New Jersey and its domestic affiliates announced January 14 that they would put into effect immediately a reduction of 15,000 bbls. daily in the amount of crude oil to be run through their stills. This represents a reduction of about 5 per cent, as the company and affiliates have been refining about 300,000 bbls. daily.

Because of the rapid increase in the stocks of petroleum products, especially gasoline, it is thought other refining companies probably will take similar action. Last week runs of crude oil to domestic refineries averaged 3,210,000 bbls. daily. A reduction of 5 per cent throughout the industry would mean a curtailment of 160,500 bbls. daily.

The statement of F. W. Abrams, president of Standard Oil Co. of New Jersey, the operating subsidiary of Standard Oil Co., New Jersey, reads:

"In an effort to place inventories in line with requirements, the Standard Oil Co. of New Jersey, incorporated in Delaware, and its domestic affiliates are reducing crude oil runs to stills a total of 15,000 bbls. a day until further notice.

"Further reductions will be made if necessary to maintain inventories at a satisfactory level. The curtailment will have no effect on employment."

To supply anticipated demand for oils used in heating, refineries have been operating at high capacity. Because of the mild winter so far, the demand for these oils has not been as heavy as expected. The result has been gasoline stocks have been increased to record levels for this time of the year and are about 14,000,000 bbls. more than a year ago. Gas and fuel oil stocks also are about 13,500,000 bbls. more than a year ago.

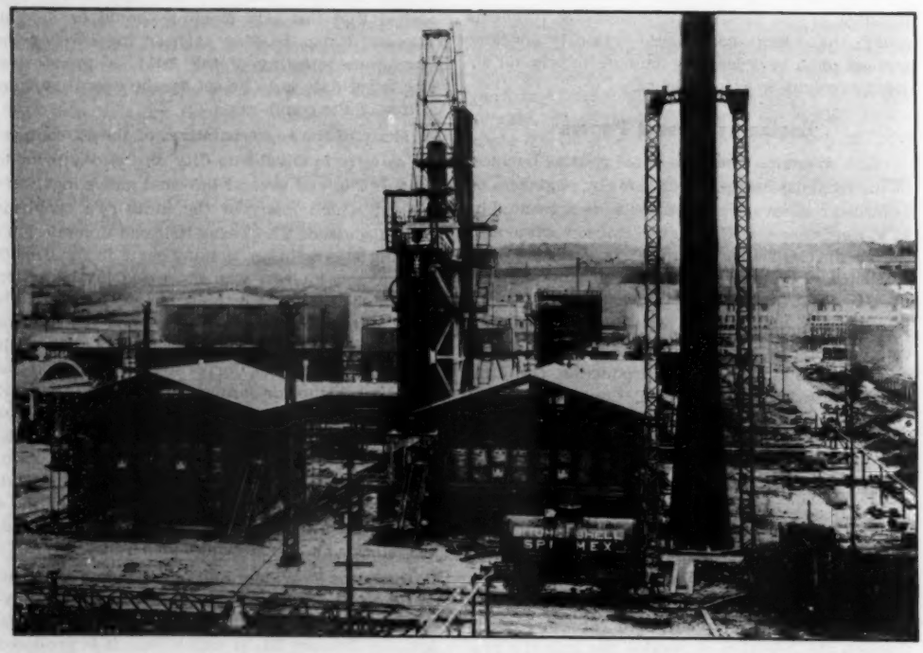
Texas Commission's Engineer Favors Sunday Shutdowns

AUSTIN, Tex., Jan. 17.—Recommendation that production of all Texas fields be shut in Sundays for four weeks or be curtailed equivalent to one day's allowable each week was renewed by V. E. Cottingham, chief engineer of the Railroad Commission, at the monthly statewide proration hearing. Little opposition was voiced to the proposal, which, if carried out, will cut the state's production one-seventh, or an average of more than 200,000 bbls. daily, based on the January 15 allowable of 1,405,240 bbls.

Mr. Cottingham proposed that only wells which definitely would be injured by a complete shut in, and those needed to meet gas market requirements be permitted to produce Sundays, but required to curtail production the equivalent of one day's allowable. He presented bottom-hole pressure reports of the East Texas field indicating pressure conditions had been materially benefitted and conservation effected by the Sunday shutdown experiment. In the pressure period, November 8 to December 7, inclusive, with three Sunday shutdowns, average bottom-hole pressure increased from 1,130.93 to 1,131.20 pounds, or .27 pound. In contrast, during the pressure period from December 8 to January 7, inclusive, with only one Sunday shutdown, average bottom-hole pressure dropped 11.22 pounds to 1,119.98 pounds, a decrease of .726 pound per million barrels withdrawal (total withdrawal was 14,725,467 bbls.)

Cottingham expressed opinion that the proposed statewide Sunday shutdowns would benefit all water-drive fields to which type most Texas fields belong, and would result in greater conservation.

Due to new wells being completed, allowable production January 15, as reported by Chairman C. V. Terrell, was 47,010 bbls. greater than the allowable of December 18, and 39,540 bbls. above the Bureau of Mines estimate for Texas during February which is 1,365,700 bbls. daily.



Furnaces and fractionating towers in the refinery of Societe de Petroles Anonyme, at Jupiter, France

GOV. ALLRED VISITS FIELD

Governor James V. Allred's party inspecting the Jack Kadane No. 1 Mangold well, discovery well

opening up the western side of the K.M.A. deep field to the rapid development now in progress. Jack Kadane is seen opening the well with the governor looking on.

Motor Output Above 5,000,000 Mark for Second Time

Factory sales of American motor vehicle manufacturers in 1937, with December estimated at 337,559, passed the 5,000,000 mark for the second time in history. This was established when the Automobile Manufacturers Association released its regular preliminary monthly report, revealing that December shipments had enabled the industry to finish the year with a total volume of 5,002,188 cars and trucks.

On the basis of this figure, 1937 operations were not only the second best in the industry's experience, but exceeded the previous year's volume by 8 per cent. December shipments were 12 per cent under the previous month, and 36 per cent under December, 1936.

The association's report is summarized below:

December, 1937	332,559
November, 1937	376,637
December, 1936	518,958
12 months, 1937	5,002,188
12 months, 1936	4,616,274

Bureau of Mines Estimate for February 3,438,200 Bbls.

WASHINGTON, D. C., Jan. 18.—The Bureau of Mines forecasts the daily average supply of domestic crude required to meet February demand at 3,438,200 bbls. Domestic motor fuel demand is estimated at 32,550,000 bbls. Gasoline stocks December 31 are put at 77,400,000 bbls., and estimated production of gasoline 41,050,000 bbls.

The estimated daily average crude oil requirements for February by the principal states are: Texas 1,365,700 bbls., California 693,700 bbls., Oklahoma 569,700 bbls., Louisiana 239,400 bbls., Kansas 176,400 bbls., New Mexico 105,100 bbls.

Antiknock Changes Delayed; Custom Made Lubricants

By C. O. WILLSON

DETROIT, Mich., Jan. 15.—There will be no immediate changes in the existing methods of testing motor fuels for antiknock ratings it was indicated here this week in connection with the annual meeting of the Society of Automotive Engineers. Developments at the motor fuels sessions which were an outstanding feature of the annual meeting and information obtained from those who are in close touch with the studies being made of testing procedures, pointed to delays which would at least extend through 1938.

Several reports which have a bearing on laboratory and road tests of motor fuel performance were presented at the meetings which were attended by over 150 representatives of oil companies from all parts of the United States and three foreign countries. The sessions were also largely attended by representatives of the automobile manufacturers, several hundred of whom were registered at the annual meeting which got under way Monday. Technologists feel that steady progress is being made through these investigations toward an objective that will give oil refiners a laboratory method of testing which will correlate satisfactorily with data obtained in road performance.

Several matters that have to do with testing were considered at a meeting of the C.F.R. committee held here today. The meeting attended by 50 members also took under advisement for further study a report on antiknock testing by an affiliated British group.

"Custom Built" Oils

The prediction that in the near future the oil industry will be called upon to furnish "custom built" lubricating oils for the aviation trade was brought to the meeting by research investigators of the Bureau of Standards. The bureau has been carrying on investigations of lubricating oil performance in connection with the requirements of the military branches of the government.

Other reports at the meetings of special interest to the oil industry showed the increasing importance of diesel fuels in automotive and aircraft power applications with new data on the desirable characteristics and methods of testing extreme pressure lubricants being given. The following report summarizes some of the high points of the meetings divided as to developments in motor fuels, lubrication and diesel engines.

Motor Fuels

A. E. Becker of the Standard Oil Development Co. and chairman of the laboratory procedure group, which was appointed by the Cooperative Fuel Research Committee in November, 1936, reported on the "Effect of Test Conditions on Fuel Ratings." The objective of the work of this group as explained by Mr. Becker is:

"1. To develop several sets of test conditions to give ratings between those of the motor and research methods.

"2. To develop, if possible, a set of test conditions that would be more severe than the motor method.

"3. To develop a set of test conditions that would be as mild or if possible, less severe than the research method."

The report explained the study that was made of engine variables influencing ratings of a fuel, and the general conclusion was "that correlation between road and laboratory values is not a simple problem." In this connection under the direction of the Cooperative Fuel Research Committee, tests of representative motor fuels which involve changes from the present motor and research methods, are being made at 20 laboratories of oil companies and others cooperating in this program. The tests will be completed by the end of this month when the data will be correlated for possible recommendations regarding changes in test procedure. It is not anticipated, this work will be far enough along so that action can be taken this year in regard to a change in the present A.S.T.M. method. The object of the entire program as previously explained is to perfect a laboratory method of testing which will correlate with data obtained last year in the Uniontown road tests.

J. B. Macauley, Jr. of the Chrysler Corp., reported on the C.F.R. Motor Survey and T. A. Boyd, General Motors Research Corp. and chairman of the Road Test Planning Group gave a report on the C.F.R. 1937 Road Knock Tests. The essential features of these reports were given at the annual A.P.I. meeting in Chicago, November, 1937.

Engine Variables

The paper by Earl Bartholomew, Harold Chalk and Benjamin Brewster, Ethyl Gasoline Corp. showed that unequal distribution of fuel in the cylinders of an automobile is one of the important reasons why laboratory knock-ratings of motor fuels do not correlate with road performance. This study, which tends to emphasize the difficulties of the entire program, was widely commented upon.

"It is hoped," the authors concluded, "that automotive engineers will find a not-too-expensive method for lessening the variations in gasoline

Cooperative Fuel Research Committee in session. Dr. Herbert Best, Yale University, (at head of table), chairman; C. B. Veal of the Society of Automotive Engineers, (to Dr. Best's right), secretary

distribution in automobile engines, particularly when running at low speeds." This paper was published in part in the January 13 issue of The Oil and Gas Journal, starting on page 53.

Lubrication

The many angles to satisfactory lubrication, due to the variety of operating conditions in aviation engines, were outlined by O. C. Bridgeman and M. L. Leidig of the National Bureau of Standards in a paper entitled "The Effect of Oil Characteristics on Wear in Aviation Engines." The paper was a progress report based on research work now being conducted. No definite recommendations were made regarding the required specifications in oils.

Starting with the definition of wear as "the removal of material from one or both of two surfaces moving relative to one another, during their relative motion" the authors first outlined the significance of surface composition and structure in relation to lubrication and wear. It was explained that while chemical composition of surface did not effect the viscosity of oil, it did have a bearing on the adhesion properties of the surface film of the lubricant. The intensity of the adhesion is specific for each metal surface-lubricant combination. It was suggested that lubricants could be developed which will neutralize the harmful effects of abrasives.

In regard to operating conditions assuming a specific combination of metals, metal wear it was explained, depends largely upon speed, load and temperatures in relation to lubricant characteristics. Regarding the lubricants it was stated that lubricant film should be as thick as possible. The properties of lubricants independent of the surface of the metal are viscosity, viscosity index and pressure coefficient of viscosity.

Aircraft Lubricants

With particular reference to the problem of wear reductions in aviation engines the authors said in part:

"The problem of choosing lubricants of satisfactory characteristics for use in aviation engines is complicated by the variety of operating conditions in any one engine and by the number of different metal combinations. Thus on the upper cylinder walls, in the wrist pin bearings, and in the ring grooves, the temperatures are high and may exceed the critical value for maintenance of a lubricating film with some lubricants. On the other hand, the temperatures are comparatively low in the reduction gears, auxiliary gears, and master rod and knuckle pin bearings. The variety of metal combinations found in the engine which are subject to relative motion are still more diverse. In the cylinders, there are all combinations of aluminum alloy, cast iron, and alloy steel. In the rod assembly, the wrist pin and knuckle pin bearings involve hardened steel rubbing on bronze.

"Various metal combinations may be found in the master rod bearings while steel against steel is employed in the reduction gears. It is asking a lot of any one lubricant to function satisfactorily under these various operating conditions and with the multitude of metal combinations involved, and yet up until recently uncompounded mineral oils have been reasonably satisfactory. As the output of aviation engines increases, however, it is anticipated that the problem of developing aviation lubricants will become more specialized. It is possible to picture a state of knowledge of lubrication in relation to wear in which lubricants can be built up for any given set of operating conditions or any metal combination by compounding with a highly stable mineral oil small percentages of the appropriate compounding material. In addition to compounding for wear control, it may also be necessary to compound for reduction in ring-sticking, for high oiliness in master rod bearings under power-driving conditions, for extreme pressure characteristics in connection with reduction gear lubrication, and for protection against corrosion and rusting. In other words, the aviation lubricating oils in the not too distant future may have to be custom built in a number of respects for the particular application."

Extreme Pressure Lubricants

Committees making investigations regarding extreme pressure lubricants reported important progress in their work.

The group delegated to analyze test results obtained on three lubricants tested on S.A.E. extreme-pressure machines produced in the first two production lots, reported the results of 20 laboratories out of a possible 31. These results indicate that the machine as now constructed and operated in accordance with the tentative procedure adopted at the 1937 summer meeting of the committee, is satisfactory as a "go" or "no go" gauge for the powerful type of extreme-pressure lubricants. Whether revised procedure and machine will satisfactorily rate the milder type of extreme-pressure lubricants or not is a matter for further research according to members of the committee.

A summary report of all wear test data on extreme-pressure lubricants made available to the subcommittee on wear was presented. The report was referred back to the subcommittee with instructions to put it into suitable form for circulation to the members of the committee and to those who attended the meeting.

The subcommittee on corrosion reported that an effort is being made to accumulate accurate data on corrosion but to date these data are too meager to use as a basis for a constructive program. It was stated that to date the S.A.E. machine appears to be satisfactory in evaluating scuff resistance as measured in cars by the present generally accepted G.M. scuff test.

A special subcommittee was delegated to obtain the latest available operating instructions for test procedure for all available machines used in evaluating extreme-pressure lubricants, with particular reference to the S.A.E., Timken, Faville-Le Valley, and 4-ball machine, this information to be forwarded to the various members of the committee for information. The committee was charged with further responsibility of obtaining, insofar as possible, the reasons for the procedure as outlined, without assuming responsibility for that reasoning. A group was delegated to recommend suitable test oils from present available stocks for use in check tests on machines in the last production lot or any further machines which may be produced and sold within the next six months.

Crankcase Oil Stability

In regard to the work on crankcase stability it was reported that six oils of S.A.E. 40 have been shipped to the testing laboratories and a schedule for submitting results adopted. Three oils of S.A.E. 60 viscosity will be shipped within the next two weeks. Details of test procedure in the interest of producing comparable results were discussed and action taken at a meeting here. The condition known as "stuck ring" was defined. The results obtained in these tests will be analyzed by the program group as soon as they are available.

What Is E.P. Product?

J. A. Moller and H. L. Moire presented a paper which is the result of exhaustive field and laboratory investigation of the Pure Oil Co. answering the question "What is An E. P. Product." The six types of lubricants used in the investigation were: 1—Sulfurized chlorinated saponifiable lead soap. 2—sulfurized fatty oil containing metaloid derivative. 3—Chlorinated hydrocarbon. 4—Lead soap—active sulfur. 5—Lead soap—active sulfur. 6—Sulfurized mineral oil.

The findings as reported are not in agreement with some of the principles accepted by many regarding extreme-pressure lubricants. Results were shown in a series of curves showing the results obtained with the different type lubricants. "The significant observation which can be drawn from all of these curves" according to the authors, "is that with the lead type of lubricant, unless conditions are such that its adhesive characteristics can be brought into play, no real extreme pressure characteristics are noticeable; while on the other hand, the stable type of lubricant, does seem to give fairly good account of itself."

Diesel Performance

Supercharging and improved fuels will widen the use of the diesel engines it was predicted in papers presented at the sessions devoted to diesel developments. Power increases up to 50 per cent with the supercharger were reported.

Ernest G. Whitney and Hampton H. Foster of the National Advisory Committee for Aeronautics predicted that the diesel engine will be a serious competitor of the gasoline motor for aircraft. The advantages claimed for the diesel engine were freedom from knocking, cheaper fuels, reduced fire hazards, and the elimination of considerable accessory equipment. They reported that a new 2,000-hp. German junkers diesel engine is being built to weigh less than 1 pound per horsepower developed.

In regard to gasoline engines for aircraft Ivar L. Shogran of the Douglas Aircraft Co. told of a four-engined land transport airplane of 60,000 pounds gross weight. This plane will accomodate 42 passengers and a crew of five, being about twice the size of the planes now in cross-country service. The plane has four independent fuel systems, one for each engine. Each engine has a 100 gallon tank for take-off fuel and a 300 gallon tank for cruising fuel. The fuel is interchangeable and the tanks can be fueled at the rate of 100 gallons a minute.

J. R. MacGregor and W. V. Hanley of the Standard Oil Co. of California reported on diesel engine deposits. This paper appears in part in this issue of The Oil and Gas Journal, on page 90.

Dr. Herbert Best, of Yale University, is chairman of the Cooperative Fuel Research Committee, and C. B. Veal, of the Society of Automotive Engineers, is secretary.

Other members of the committee attending the meeting were: H. J. Gibson, Ethyl Gasoline Corp.; C. C. Moore, Jr., Union Oil Co.; W. M. Holaday, Socony-Vacuum Oil Co.; T. H. Risk, Pure Oil Co.; W. E. Drinkard, Chrysler Corp.; R. Haskell, Texas Corp.; I. W. Broughton, National Research Council, Canada; H. D. Chantler, Bureau of Mines, Canada; T. C. Burk, Atlantic Refining Co.; G. S. Hope, Socony-Vacuum Oil Co., Inc.; S. A. Marshall, Shell Oil Co. of California; J. Bennett Hill, Sun Oil Co.; A. G. Cattaneo, Shell Development Co.; S. Raymond, Tide Water Associated Oil Co.; Earl Bartholomew, Ethyl Gasoline Corp.; H. K. Cummings, National Bureau of Standards; N. G. Ainsley, Sinclair Refining Co.; Charles W. Butler, Gulf Research & Development Co.; J. R. Sabina, Du Pont; J. M. Campbell, General Motors Research Corp.; B. E. Sibley, Continental Oil Co.; L. E. Hebl, Shell; W. B. Ross, Pure Oil Co.; T. A. Boyd, General Motors Research Corp.; A. L. Brau, Wright Aero Corp.; Donald B. Brooks, National Bureau of Standards; Josiah French, Gulf Oil Corp.; C. B. Kass, Standard Oil Development Co.; A. J. Blackwood, Standard Oil Development Co.; H. C. Hunter, Gulf Research & Development Co.; A. E. Becker, Standard Oil Development Co.; R. B. Rendel, Shell Petroleum Corp.; John Eisenger, Standard Oil Co. of Indiana; J. R. MacGregor, Standard Oil Co. of California; Abbot A. Lane, Gulf Research & Development Corp.; Harold M. Trimble, Phillips Petroleum Co.; Arthur W. Pope, Jr., Waukesha Motor Co., and G. L. Neely, Standard Oil Co. of California.

WASHINGTON

By Henry D. Ralph

WASHINGTON, Jan. 17.—Hope for eventual elimination of the federal excise taxes on gasoline and lubricating oils is contained in the report of the tax revision subcommittee of the house committee on ways and means and in the comments on this report made to the committee by Roswell Magill, under secretary of the Treasury.

The subcommittee recommended the repeal of 10 relatively minor excise taxes, including the three so-called "hot" oil taxes, as of June 30, 1938, although most of this group would expire automatically on June 30, 1939. This recommendation was described as "a beginning in eliminating some of the less desirable excise taxes," and declared that while it might be desirable to secure an increasing proportion of federal revenues from taxes based on ability to pay, at the present time it is not feasible to eliminate any considerable number of the excise taxes on account of the present need for revenue. The suggestion that the gasoline and other taxes which expire in 1939 be made permanent was considered by the subcommittee, but it concluded that "the temporary character of these taxes should continue to be recognized," a suggestion that the majority of the subcommittee favors their complete elimination some time in the future.

This view apparently meets the approval of the treasury, for Dr. Magill, in opening the hearings before the full committee, declared: "The revenue system, as a whole, would be considerably improved if the temporary excise taxes upon commodities in common use could be gradually eliminated, the lost revenue being provided, if necessary, by increases in the income tax and estate tax. The treasury, as well as the subcommittee, hopes it will be possible to eliminate additional excise taxes in the next few years as budgetary conditions improve." He added the treasury will make further studies of the excise taxes and will submit recommendations to the committee some time in the future.

Dr. Magill apparently acquiesced in the action of the subcommittee in deferring consideration of changes in the oil and mineral depletion allowances, though he left the impression the treasury still desires this subject to be considered in the future.

The three "hot" oil taxes recommended for repeal this June are those imposed by the revenue act of 1934 on the sale of crude petroleum, the processing or refining of crude petroleum, and the production of gasoline from natural gas. The three together are estimated to yield $870,000 during the current fiscal year. This repeal will not affect the import taxes on petroleum and products nor the excise taxes on sales of gasoline and lubricating oil.

CORPORATION TAX REVISION

The bulk of the subcommittee's recommendations deal with revision of the corporation income taxes which the report says will provide a very substantial stimulation to business without making material changes in the amount of revenue produced.

Declaring criticisms of the surtax on undistributed profits have been greatly exaggerated, the subcommittee recommended retention of the principle of this tax but with important modifications. Chief of these is that corporations with a net income of less than $25,000 be exempted from the profits tax and subjected to normal income taxes graduated from 12½ to 16 per cent. Corporations with incomes of more than $25,000 would be subject to a flat tax of 20 per cent if they distribute no profits in dividends, but through a modified form of the undistributed profits tax they could reduce this rate by four-tenths of one per cent for each 10 per cent of income distributed, so that by distributing all their income they could reduce the rate to 16 per cent. For corporations with incomes ranging between $25,000 and $37,000 an optional combination rate is offered under which would permit a choice between a flat rate and the undistributed profits scale.

A new tax plan is proposed for closely held corporations, where one person holds 50 per cent of the stock or 10 persons hold 75 per cent, and which have net incomes of more than $40,000 which is not distributed to stockholders. The chief object of this so-called "third basket" is to reach corporations which may be used by wealthy individuals to avoid personal income taxes. This was professedly the object of the 1936 undistributed profits tax, and the subcommittee thus recommends revising the law to apply more lightly on business corporations and more heavily on family corporations or "incorporated pocketbooks."

The recommendations are expected to be approved by the full committee and by the house without much change, and congressional leaders hope to have the new law enacted by the middle of March, although none of the changes will affect 1937 income tax returns.

HOLDING COMPANY ATTACK

President Roosevelt's press conference remark that he favors the elimination of all holding companies, industrial as well as utility, and even "first degree" or operating holding companies, has seriously upset those of his advisers who hope for closer cooperation between the administration and business. Applied literally and without discrimination, such a program would break up the major integrated oil companies and would affect practically all business corporations which own or control subsidiary companies, and industrial reform on such a scale would obviously disrupt business conditions for a long time to come.

The vague and off-hand nature of the president's remarks, coupled with the fact that the majority of congressmen and of administration advisers are not prepared to engage in a fight against industrial holding companies indicates no legislation on the subject will be enacted in the immediate future. However, publication of the president's views gives impetus to much business reform legislation sponsored by various groups in congress, such as the Biermann bill to prevent producing oil companies from engaging in marketing, the Patman bill to prevent any manufacturers from retailing in competition with dealers, various anti-chain store bills, the Borah-O'Mahoney corporation licensing bill, proposals for punitive taxes on intercorporate dividends, and many others.

The president's remarks were made in the course of a discussion of the utility situation in which he declared that the administration will not retreat from the "death sentence" provision of the utility holding company act which provides for breaking up all but first degree holding companies in the electric utility field. From this he digressed to say he can see no reason for any type of holding company in any field. This view fits in with the attacks which the president and several of his spokesmen have been making on concentration of wealth and economic power, but heretofore it was assumed the major attack would be along the lines of revision of the antitrust laws rather than that of corporate structure and financial relationships of industrial corporations.

The discussion of holding companies shows that the president is groping for a solution to what he considers a social problem but has not yet decided what course to follow.

Montana Opponents of Proration Protest Vigorously at Hearing

GREAT FALLS, Mont., Jan. 15.—Vigorous opposition to proposals to prorate Montana crude production was voiced here this week by witnesses at the hearing by the Montana Oil Conservation Board, which recessed this afternoon to reconvene Thursday, January 20.

Most of those who appeared in opposition declared any such plan would hinder development by further slashing market outlets and hampering the trend toward construction of new refineries. It was said several new plants are planned and that these are offering contracts for purchase of crude, with prospect that new markets will shortly be opened to offset loss of the Canadian market, now being for the most part supplied by wells in Turner Valley.

An additional difficulty was presented when Fred Platt of Shelby, petroleum engineer, testified it would cost more than $400,000 to make a test of production to fix allowables under any proration plan.

Other witnesses included W. M. Fulton, pioneer state operator; J. N. Theien, oil attorney; Al Wilkinson, R. C. Jeffries, George McCabe, H. F. Patterson of Billings, and W. E. Burks, all Cut Bank operators; Dr. Boris A. S. Aronow, Kevin-Sunburst operator and refiner; Lee Yealey, Ohio Oil Co., superintendent, who testified as an expert witness without expressing an opinion on proration; George Downs, Kevin-Sunburst operator, and Casper Olen, Shelby, Kevin-Sunburst operator, who was called in rebuttal by proration proponents.

William F. Knode, former chief engineer of the Texas Railroad Commission, who has been here throughout the hearing, was not called. Failure of proration proponents to advance a concrete program upon which he might have commented was given as reason for failure to call him.

Indignation at any plan to curtail the output was expressed by Mr. Fulton, who denounced any effort to curb production in Montana until the state is producing enough oil to supply its own needs, declaring:

"No other state has been so idiotic as to prorate when its production was as small as that of Montana. It is pure nonsense to talk about prorating the little dab of production we have here. Here sits Wyoming south of us, ready to supply all our markets if we will turn them over to Wyoming producers. Wyoming has no proration and never will be prorated. If we are going to prorate Montana producers to help the 'little fellows' now without a market, then I propose that the importers of gasoline and crude be prorated. Proration will result only in giving our market or half of our market to the importers."

Mr. Fulton advocated a current campaign to encourage Montanans to buy Montana-made gasoline, and construction of additional refineries in adjacent states, particularly in the Dakotas and in Idaho and Washington.

"Proration means slow death to independent producers," he asserted, adding, "If we prorate wells now in production, no one will make enough money to pay for more drilling."

R. P. Jackson, secretary of the oil board, testified concerning daily capacity of state refineries. His figures showed a daily possible handling of 26,846 bbls., against a daily potential of less than 18,000 bbls. for all state fields combined.

Dr. Aronow, a leader in the movement to create the board before which the hearing is being held, declared the board was formed "for the sole purpose of protecting the Montana oil industry against the importers who dominated the NRA board in this region." He asserted that importing companies had consistently used the price differences as a means of "beating down" independent producers and refiners, each in turn.

Field reports during the week disclosed that a large number of producers in the Kevin-Sunburst and Cut Bank fields have contracted for the erection of tanks of from 5,500- to 80,000-bbl. capacity to store crude in anticipation of an improved market.

Coupled with this report was publication of a survey showing that the new Yale refinery at Kalispell has signed contracts covering delivery of about 1,300 bbls. of crude daily, and that the Wasatch refinery at Pocatello, Idaho, has thus far signed contracts calling for delivery of about 800 bbls. daily.

In the meantime, James W. Johnson of Shelby, acting as agent for unnamed principals, continued efforts to contract up to 5,000 bbls. of daily production for a plant to be built "adjacent to Cut Bank and Kevin-Sunburst fields." He has announced he must have contracts signed by February 5, when he is scheduled to announce definitely his plans for a refinery. Contracts are being placed in escrow in a Shelby bank. Under their terms, the refinery must be constructed on or before August 1, this year.

Standard Oil Twenty-Year Club Elects Officers

After two mass meetings to determine the sentiment of the employes, and Alex Nylund and Harry O. Roth had been selected, as temporary chairman and secretary, and with by-laws adopted, the Standard Oil Twenty-Year Club held its first regular meeting January 13, in Eagle's Hall, Independence, Mo. and elected officers for 1938. The meeting was called to order by H. C. Moore and the following officers were elected: Alex Nylund, president; C. E. Ewin, vice president; H. O. Roth, secretary-treasurer; J. O. Hinde, vice secretary-treasurer; Earl Roby, sergeant at arms.

The club was organized for social activities only, and does not conflict with the Refinery Employes Independent Union.

Automotive Engineers Society Announces Sectional Meeting

The next meeting of the Tulsa area S.A.E. group will be held at the Tulsa Hotel, Tulsa, at 7:30 p.m. January 28, according to F. A. Suess, secretary.

Blowout in Well at Kilgore Quickly Followed by Fire

FORT WORTH, Tex., Jan. 18.—Overton Refining Co. No. 3 Nettie Crane, across the street from the city hall at Kilgore, East Texas, blew out during drilling, caught fire and for a time menaced the center of the town. A hospital nearby was partly burned after the five patients had been rescued. Five other wells were on production within 50 feet.

The well was brought in flowing 25 bbls. in 25 minutes. The crew was running tubing when the blowout occurred.

Lewis Run Gas Well Reported Making 6,000,000 Feet

BRADFORD, Pa.—Addition of 3 feet in the Williams-Becker gas well in Lewis Run, 9 miles south of here, increased production from 100,000 feet to 6,000,000 feet. The well is one of the largest producers ever struck in McKean County, and has been producing for some time. Drilling was discontinued when the 3-foot depth increase brought the heavy flow.

The well "blew in" with a flow of 5,000,000 feet daily. The gas is coming from the Sliverville sand which has provided three oil gushers for two other companies, Niagara Oil Corp., and Minard Run Oil Co., both of Bradford. The well is owned by E. A. Williams and John Becker of Bradford. Sliverville sand is found at a depth of 1,697 feet.

Spring Meeting of Mid-Continent District to be Held in February

C. E. Sturdevant, of Phillips Petroleum Co., Pampa, Tex., has been appointed general chairman of a committee which will sponsor the 1938 spring meeting of the Mid-Continent District of the American Petroleum Institute's Division of Production, February 17 and 18, in the Herring Hotel at Amarillo, Tex.

Appointed to aid Chairman Sturdevant are: R. C. Kay, chairman of registration committee; C. A. Daniels, Phillips Petroleum Co., Amarillo, chairman of program committee; M. D. Bartlett, News-Globe, Amarillo, chairman of publicity committee; and Mason King, News-Globe, Amarillo, chairman of entertainment committee.

Subjects being considered for discussion include new developments in oil well shooting, unitization, gas-oil ratio control, accident prevention, vocational training, and use of hydraulic pumps.

Bruce K. Brown Manager of Indiana Standard Research

Standard Oil Co. (Indiana) announces appointment of Bruce K. Brown to fill the position of general manager in charge of research and development. Mr. Brown has been employed by the company since 1929, first as its general patent attorney and in later years as manager of the development and patent department.

He holds degrees in chemistry and chemical engineering from the University of Illinois. He began his business career as a research chemist for the Burgess Laboratories at Madison, Wis. Later he directed research for the Commercial Solvents Corp. at Terre Haute, Ind., and served as the head of its patent and research information departments. Immediately prior to his affiliation with Standard Oil, he was associated with the New York patent law firm of Fish, Richardson & Neave.

Mr. Brown is the author of numerous articles and one book relating to nitrocellulose lacquers, and holds a number of patents in the battery, solvent and petroleum fields. He has been active in the affairs of the American Chemical Society, having been at one time

Blank & Stoller

BRUCE K. BROWN

editor of the Chicago Chemical Bulletin, and has also been identified with various patent law groups. He is a member of the Chemists' Clubs of New York and Chicago, the University Club of Chicago, and various professional societies.

In recent years Mr. Brown has been prominently identified with the developing and licensing of various processes in the petroleum industry, being a director of a number of patent-licensing companies, including Gasoline Products Co., Gasoline Antioxidants Co., Lubrication Corp., and others.

In his new work Mr. Brown will supervise the activities of Standard's various refinery research laboratories, the largest of which is at Whiting, Ind., as well as the general activities of the company in connection with patents and technical developments.

the OIL AND GAS JOURNAL

PRODUCING REFINING NATURAL GASOLINE PIPE LINE

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Setting an Example

The heavy increase in gasoline stocks has been the main topic in the industry in recent weeks, but, like Mark Twain's weather, while everybody discussed it nobody did anything about it. Nevertheless, it was plain that immediate action was required because the industry could not wait until early April for the beginning of the consuming season to make drafts on the storage that would then overhang the market.

The announcement that the Standard Oil Company of New Jersey will curtail its throughput 15,000 barrels daily during the latter half of January, or approximately 5 per cent, is an example of leadership to be considered thoughtfully throughout the refining branch.

This action was taken because stocks of several products were found to be climbing at a rate indicating trouble in the future while others were not moving out as rapidly as had been expected so far this winter.

The rapid rise in gasoline storage has caused other eastern companies to consider means of checking it. The situation has reached a point where general remedial action is essential. The habitual inertia while waiting for somebody else to do something cannot be prolonged if the industry is to get out of the danger zone in which it definitely now is.

The refining branch should join hands with the state regulatory bodies which have worked to keep the production of crude oil in line with demand. Producers were at one time as hard to convince of the necessity for curtailment to demand as the refining industry has been. It took painful experience to illustrate the lesson.

Refiners, on the other hand, while occasionally overtaken by the consequences of excessive production, have been fortunate in recent seasons in having an entirely unexpected increase in consumption to save them. There is apparently no probability of like relief this year, which will do well if the consumption of petroleum products slightly exceeds last year's demand.

The producing industry has passed out of the feast or famine fluctuations of the old days. It is operating more intelligently, conserving its values and looking farther ahead.

Developments like the results of deeper drilling in the K.M.A. field in North Texas and the extensions in the Illinois Basin have minimized the familiar alarums about an impending shortage of crude. Back in 1924 our reserves of petroleum were estimated at a scant seven billion barrels but in 1932, after producing eight billion barrels, the estimated reserves were placed at twelve billion barrels.

Deeper drilling and secondary recovery are now counted upon to postpone indefinitely the day when actual shortage may become of immediate interest.

Continually improving methods of exploration, geological, geophysical, and in testing equipment, give assurance that the unceasing discoveries which have prolonged our supply of petroleum to the present day will be continued for a long time to come.

With its supply of raw material in process of stabilization, with no threat of either glut or shortage, the industry looks to its manufacturing division to rationalize its operations in line with requirements, the essential condition upon which the welfare of the entire industry depends.

The example set in the East is an indication of what is needed. No one company, however important, can be expected to bear the burden of correction required. If stocks are to be reduced to a healthy condition before the opening of the main consuming season it will require general cooperation commensurate with the job.

Supreme Court Decisions Crux of Case in Madison Trial

By R. B. PYRE

MADISON, Wis., Jan. 18.—Power of indicted oil companies to control the independent gasoline market was a major consideration today as arguments to the jury continued in the antitrust trial.

Vital importance attaches to the instructions of Judge Patrick T. Stone on that point, for it is the determining element for the jury to consider whether the issues are narrowed down to those of the Trenton potteries case or broadened to embrace the doctrine of the Appalachian coal case. Under the Sherman act, as interpreted in the Trenton case, if a combine completely dominates a market and concerted action is taken to influence the price, a violation of the law has occurred and the "reasonableness" of the price fixed has no bearing. But under the Appalachian case, in which coal operators combined to purchase distress fuel, the Supreme Court held they did not control the market, hence could not fix prices, and the "rule of reason," and the elements of "justification" and "acquiescence became applicable."

Judge Stone has not indicated his position definitely on this issue. He expects his instructions will consume about an hour.

Theodore W. Brazeau of Wisconsin Rapids, counsel for Cities Service Co., opened argument for the defense Tuesday upon completion of a government plea by John H. Lewin. Brazeau was to be followed by H. H. Thomas, Madison, associate chief counsel, and Col. W. J. Donovan, chief of the defense staff, was to close the argument.

Rebuttal arguments for the government will be made by William P. Crawford and Hammond E. Chaffetz.

Arguments started Monday after Judge Stone had reserved ruling on formal motions for directed verdicts on behalf of all defendants.

Opening for the government, John H. Lewin charged the entire defense was a "sham" and a "red herring" to cover up a "withering conspiracy," and called upon the jury to change the popular conception toward law enforcement—"that wealthy people are above the law."

Ridiculing the defense claim through its expert witness, Sidney A. Swensrud, that the indicted companies could not have controlled the midwest market because gasoline would immediately have flowed into the territory from the outside at lower prices if an "artificial" level were established, Lewin declared large eastern companies "weren't going to leave their own good market to break down the schemes of other majors."

"There was a third pool, A Gulf Coast pool," he told the jury, "and the companies on the East Coast divvied up the surplus as these defendant companies did in East Texas and the Mid-Continent. The eastern pool was engineered by the same gang."

He denounced Swensrud's testimony as "chicanery" and castigated the defense claim that the indicted companies bought primarily to help small refiners and purchased only gasoline they needed.

"They helped the refiners temporarily to help themselves by thousands and millions of dollars more," he declared. "You men have been inflicted with a theoretical cock and bull story that would tax the credulity of a child."

The alleged "knowledge or acquiescence" of minor government officials made no difference in the issues of the case, he maintained, and he charged the buying program was carried on even more effectively after the code stopped than before it was invalidated.

Lewin claimed indisputable evidence that the major companies held and exercised the power to control the market, and this "power to control," was important. While the government throughout has held that the issue is narrow and simple under the doctrine of the Trenton Potteries case which eliminates the "rule of reason" when complete domination of the market is shown, the defense has proceeded under the theory of the Appalachian Coal case which holds that a group which does not control the market cannot fix prices.

"I tell you," Lewin said to the jury, "the major company purchase of all or practically all of the gasoline that otherwise would have gone at lower prices was the direct force that held up the price on a cruel level month after month."

Occupying the entire day, Lewin continued to denounce the defendant companies as "greedy" and cruel. He charged the defense with a "shocking slur" upon honest jobbers and, he declared, the most shocking defense in the entire case was "a half baked attempt to put the blame on the government of the United States."

At the opening of the case, the defense claimed the charges originated in complaints of "a certain class of jobbers trafficking in hot oil," but Lewin declared, "not one scintilla of the ugly slur against those who were wronged most by this conspiracy has been substantiated."

He predicted instructions by the court that there was no "government approval" of the buying plan within the meaning of the law and "it is too clear for argument," he insisted, that the Ickes letter did not authorize Charles E. Arnott to take the law into his own hands and run such an enormous thing as this.

He charged Arnott not only with violation of the antitrust act but with a "betrayal of the trust" placed in him by the Ickes letter to "combat little retail price wars."

Lewin estimated the rise in gasoline attributed to the buying program netted the majors a "neat little profit" of $70,000,000.

The crude oil price increase and subsequent price rise of January, 1936, was "an unheard of thing" in the dead of winter when demand is low, he told the jury. Neil Buckley, "liaison man" in the purchasing of gasoline by major companies from East Texas refiners, gave credit to the buying plan in a May 17, 1935, letter for the rise of tankcar prices from 3⅛ to 4½ cents, Lewin declared, and he ridiculed as a "non sequitur" a statement in one of Buckley's letters that "no artificial stimulants were employed but prices were boosted by major company buying which created a normal market for surplus gasoline stocks."

Jobbers, he charged, were "hogtied" by uniform

Theodore W. Brazeau, Wisconsin Rapids, attorney for Cities Service Co.; Ralph Horween, attorney for Globe Oil companies and for A. V. Bourque; and John L. McInerney, Standard Oil of Indiana counsel

contracts under which there was no escape from prices published in the journals.

"Don't be misled," he cautioned the jury, "by any claim that an important link in the government's case was removed by dismissal of the trade publications." Their dismissal, he said, does not mitigate in any degree the fact that "the journals were the chief instrumentalities of the conspiracy."

"Perhaps they were innocent," Lewin explained. "At least we were unable to prove them guilty, but they published that rigged, artificial market day after day and if they hadn't, the jobbers wouldn't have had to pay those prices."

He also cautioned the jury "not to be misled" by the government's failure to prove "minor allegations" in the indictment, including its statement, "inserted in good faith," that the major companies purchased more than 50 per cent of all gasoline sold by the independent refiners.

"It doesn't make an iota of difference," he declared. "The thing that is important is that these defendants intended to buy all of the surplus whether it was 10, 15 or 20 per cent of the production."

And it was not necessary, Lewin argued, to prove everybody named in the indictment guilty. Whether some of the dismissed companies were guilty or not, "they did nothing to break down the effectiveness of this combination," he said, and they enjoyed the fruits of the conspiracy."

"It was shocking," he told the jury, that the government had "toiled unceasingly" to help the oil industry through orderly, regulated buying pools, scientific research and other services, only to have the major companies "turn and bite the hand that fed them," because they were so "greedy" and too impatient to wait for orderly processes.

The number of individual defendants was reduced to 36 when Judge Stone directed a verdict of acquittal for James F. Nagle, Tulsa, division sales manager of Skelly Oil Co.

The dismissal came soon after the prosecution had read into the record letters written by Nagle and his superior officer, W. T. Atkins.

The last direct witness for the defense, James D. Miller, certified public accountant of Bronxville, N. Y., concluded his testimony with deductions based upon a 6-foot chart, completed after nearly a year's work by his staff, which he said "showed clearly" that the defendant companies purchased gasoline from independent refiners at prices consistently below the published market.

Except for a short period in 1935, retail prices of gasoline were below normal throughout the year, Miller testified. Prices were lower in the Middle West during the period of the alleged conspiracy than elsewhere. In 1935 there were only three Mondays when the midwestern price was higher than that for the United States as a whole and once the prices coincided, but on Mondays throughout the remainder of the year, prices in the midwest were lower, he said.

Miller testified that the retail price late in 1934 fell 2½ cents below normal and rose close to normal for a time early in 1935, but in July, when the government charges a fixed high level was being maintained as a result of the "conspiracy," the retail price ranged from .1 to .7 of a cent below normal.

Under examination by Frederick Wood, attorney for Sinclair Refining Co., Miller produced tabulations showing the company's purchases during the 14 months of the alleged conspiracy averaged no larger than in the three months preceding the period in the indictment, and that while 31 per cent of its purchases were from independent refiners named in the indictment, 53 per cent were from other independents and 16 per cent from other majors. Sinclair bought from 10 of the 14 independents named as "co-conspirators" in the Mid-Continent buying program but purchased also from 25 other independents, he said.

Miller attacked the testimony of Carl O. Beroth, Chicago broker and one of the first government witnesses, who declared he had encountered difficulty in buying sufficient gasoline to meet his requirements in 1935 because independent refiners told him they were selling

Weymouth Kirkland, attorney for Standard Oil Co. of Indiana; William J. Donovan, general defense counsel; and S. A. L. Morgan, attorney for Texas Co.

large quantities to major companies and "had none for us." Miller showed that East Texas Refining Co., one of the independents mentioned by Beroth, had sold no gasoline to Beroth's company from late 1934 to late 1936, but during that period had sold to 27 other brokers and sold "four times as much" gasoline in all to brokers as it sold to defendant majors.

Miller pointed out his figures applied only to the 16 major companies remaining on trial. MacMurray Refining Co., in 1933, sold 746,332 gallons to defendants and only 32,011 to Beroth, but it sold 1,736,548 gallons to other brokers, he testified. Grogan Oil Co., which Beroth said had "none to sell him," sold 9,903,826 gallons to defendants, but sold 12,241,320 gallons to 50 brokers, including 738,000 gallons to Beroth's company, Miller declared. He presented similar figures from the Cascade, Trinity, Bell, Olney and Cushing refineries.

Testifying in contradiction of the government charge that the defendant companies induced their "dancing partners" to curtail production, Miller said the alleged "co-conspirators" increased production by a bigger percentage than that of all independents combined, and in a proportion greater than the increase in demand. Total production of refiners named in the indictment was 295,154,204 gallons in 1934, 356,862,182 in 1935, and 397,780,076 in 1936, he said, the increase representing 21 per cent in 1935 and 11½ per cent in 1936.

To show that government accountants erred on the number of purchases made at prices above the market, Miller reiterated his statement that prices paid by the defendants generally lagged behind the market instead of leading it to higher ground.

In answer to Hammond E. Chaffetz, government attorney, he said 56 per cent of the purchases made by defendants in 1935 were from alleged "co-conspirators" and 42 per cent in 1936.

As to the prosecution's charge that the major defendants bought at "uniformly high and arbitrary" prices, Miller testified there was no uniformity, but on the contrary "a great deal of variation" in prices paid on the same day. On 67 per cent of all days in the indictment period, purchases were made at different prices, he said.

Independents who sold the most gasoline on the spot market were those who sold the least gasoline to majors in 1935, he testified, and those who made the largest sales to major companies were those who had the fewest jobber outlets.

Miller testified prices decreased in 1936 while purchases of defendant majors increased. From April to the end of the year, he said, their purchases averaged 2,000 tankcars monthly, while their average was only 1,700 cars monthly during the preceding 14 months.

In March, April and May, 1935, he said, while the market was going up, purchases of defendants averaged 800 to 900 cars a month less than in the same three months of 1936 when purchases averaged 53 per cent higher while the market was going down. And in the last three months of 1936, while prices were rising, major company purchases fell to 1,400 cars a month from an average of 2,350 cars a month while the market was down, Miller stated.

He also produced audit results to contradict the charge that the defendant companies purchased more than 50 per cent of the gasoline sold by independents in East Texas and the Mid-Continent spot markets. From computations based upon evidence that 22 East Texas refiners named in the indictment sold 285,592,188 gallons in 1935, while all East Texas independents combined sold 378,920,346, Miller declared the present defendants bought only 14.07 per cent of the gallonage sold by the group named as "co-conspirators" and 12.03 per cent of the total independent gallonage. Later, after Judge Stone had asked how much was sold to companies originally indicted but dismissed, the accountant showed that five who purchased in the East Texas market bought only 48,289,565 gallons of the total sold by independents in 1935, which, if added to that bought by present defendants, would increase the aggregate of major purchases to less than 25 per cent.

Miller showed a series of charts illustrating that out of 377,988,736 gallons sold in 1935 by 14 Mid-Continent refiners named in the indictment the present defendant majors bought only 64,-

(Continued on Page 34)

Natural Gas News

Commission Grants Permits To 27 Texas Carbon Plants

AUSTIN, Tex.—The railroad commission announced 17 Texas carbon black plants now in operation using casinghead gas residue did not require a permit, under House Bill 266, to operate. It granted permits to 27 plants, but held up permits on 3 on the ground they were not obtaining as much as 1 pound of carbon black per 1,000 feet of gas used, as required by law.

The plants granted permits are as follows:

Company—	Location:
J. M. Huber Corp.	Borger
Magnolia Petroleum Co.	Pampa
Crescent Carbon Co.	Crescent
Continental Carbon Co.	Sunray
Crown Carbon Co.	Sunray
Panhandle Carbon Co., Inc.	Borger
Moore County Carbon Co.	Moore County
Columbian Carbon Co.	Kingsmill No. 60
Columbian Carbon Co.	Lefore No. 65
Columbian Carbon Co.	Magic City
Columbian Carbon Co.	Borger No. 51
Columbian Carbon Co.	Sunray No. 59
Columbian Carbon Co.	Wescar No. 52
Columbian Carbon Co.	Pampa No. 57
Columbian-Phillips Petroleum Co.	Cophil No. 95
Coltexo Corp.	Parks No. 71
Coltexo Corp.	Lefore No. 77
Peerless Carbon Black Co.	Coltexo
Cabot Carbon Co.	Armstrong
Cabot Carbon Co.	Kermit
Cabot Carbon Co.	Wickett
Cabot Carbon Co.	Kingsmill
Texas-Elf Carbon Co.	Eliasville
Texas-Elf Carbon Co.	Bowers
Cabot Co.	Schaffer
Columbian Carbon Co.	Lela No. 55
Columbian Carbon Co.	Corpus Christi

Industrial and Commercial Gas Consumption at Record High

The volume of gas used in industry and commerce has been at an all-time peak for two years and considerably above the predepression years. According to Hale A. Clark, chairman of the industrial gas section, American Gas Association, figures show that for 1937 the gas utilities sold 1,090,310,000,000 feet of industrial and commercial gas. These figures, which include both manufactured and natural gas, disclose a gain of 10 per cent over the preceding 12-month period or double the rate of increase in industrial production and commercial activity.

Committees For Natural Gas Department Convention at New Orleans

Committees to arrange for the Natural Gas Department convention in New Orleans in May have been appointed by Robert W. Hendee, chairman of the Natural Gas Department. The three committees named are the program committee, general arrangements committee and publicity committee and local New Orleans committees.

The convention committees will hold a meeting at the Adolphus Hotel in Dallas, Tex., Thursday, January 20, when the program will be arranged and speakers selected.

J. C. Barnes, of New Orleans Public Service, Inc., is chairman of the general arrangements committee.

Following are the members of the committees:

Program committee—H. E. Meade, New Orleans Public Service Co., Inc.; W. Jennings Young, Oklahoma Natural Gas Co., Tulsa; A. L. Forbes, Jr., El Paso Natural Gas Co.; R. W. Hendee, Colorado Interstate Gas Co.; Hugh Cuthrell, Brooklyn Union Gas Co.; C. E. Bennett, Manufacturers Light & Heat Co., Pittsburgh, Pa.; F. M. Rosenkrans, Gas Service Co., Kansas City, Mo.; W. C. Grant, Lone Star Gas Co., Dallas, Tex.; H. C. Cooper, Hope Natural Gas Co., Pittsburgh, Pa.; N. C. McGowen, United Gas Pipe Line Co., Houston, Tex.; A. E. Merchant, New Orleans Public Service, Inc.; T. R. Weymouth, Columbia Gas & Electric Corp., Pittsburgh, Pa.; A. E. Higgins, Pittsburgh Equitable Meter Co.; Chester L. May, Community Natural Gas Co., Dallas, Tex.; Streuby L. Drumm, New Orleans; T. J. Strickler, Kansas City Gas Co.; Norman McKee, Southern Counties Gas Co., Los Angeles, Calif.; Clifford Johnstone, San Francisco, Calif.; Jay C. Barnes, New Orleans Public Service, Inc.; E. L. Rawlins, United Gas Public Service Co., Houston, Tex.; J. H. Dunn, Lone Star Gas Co., Dallas, Tex.; Merrill Davis, S. R. Dresser Manufacturing Co., Bradford, Pa.; W. T. Harter, New Orleans Public Service, Inc.; Davis DeBard, Stone & Webster Co., New York; George M. Parker, Mississippi River Fuel Corp., St. Louis, Mo.

General arrangements committee—Jay C. Barnes, chairman, New Orleans Public Service, Inc.; A. E. Merchant, vice chairman, New Orleans Public Service, Inc.; B. C. Adams, Gas Service Co., Kansas City, Mo.; J. D. Creveling, Panhandle Eastern Pipe Line Co., New York; R. H. Hargrove, United Gas Public Service Co., Houston, Tex.; A. E. Higgins, Pittsburgh Equitable Meter Co.; D. A. Hulcy, Lone Star Gas Co., Dallas, Tex.; F. B. Long, Oklahoma Natural Gas Co., Tulsa; A. B. MacBeth, Southern California Gas Co., Los Angeles, Cal.; B. F. Pickard, Laclede Gas Light Co., St. Louis, Mo.; R. G. Soper, Dallas Gas Co.; McGregor Smith, Louisiana Power & Light Co., Algiers, La.; George E. Welker, United Natural Gas Co., Oil City, Pa.; L. G. Ireland, New Orleans Public Service, Inc.; J. V. Strange, United Gas Public Service Co., Houston, Tex.

Publicity committee—W. T. Harter, chairman, New Orleans Public Service, Inc.; W. C. Grant, vice chairman, Lone Star Gas Co., Dallas, Tex.; C. D. Greason, Gas Service Co., Kansas City, Mo.; Howard Weeks, Consolidated Edison Co., New York.; Earl Fisher, Pacific Gas & Electric Co., San Francisco; George Godwin, Mississippi Power & Light Co., Jackson, Miss.; A. G. Whidden, Arkansas Power & Light Co., Pine Bluff, Ark.; Robert Mitchell, Louisiana Power & Light Co., Algiers, La.

Industrial Gas Sales Conference To be Held at Pittsburgh

The annual A.G.A. industrial gas sales conference will be held at the William Penn Hotel, Pittsburgh, Pa., March 7 and 8. Hale A. Clark, Detroit City Gas Co., is chairman of the industrial gas section.

The speakers have been carefully selected by the program committee, of which Franklin T. Rainey, Ohio Fuel Gas Co., Columbus, Ohio, is chairman. The other members of this committee are: John H. Ward-

Pipe Line Activity

Four-Inch Line From Jennings Field Surveyed by Shell

HOUSTON, Tex.—Shell Pipe Line Co. is making surveys for a 4-inch pipe line to be laid from the Jennings field, Acadia Parish, Coastal Louisiana, to a connection with its Iowa-Roanoke line to Lake Charles. The Jennings field, where Shell has developed production in the new west flank development, is only a few miles from the main line. Applications have been made to the War Department for a permit to cross Bayou Nespique, a navigable stream.

Line From Crystal Field to Mount Pleasant Planned

SAGINAW, Mich.—Plans are completed, subject to approval by the Michigan Public Utilities Commission, for construction of a new 26-mile pipe line by Pure Oil Co. from the Crystal field in Montcalm County to Mount Pleasant. At Mount Pleasant it will connect with the company's present 8-inch line conveying Michigan crude to Toledo refineries.

The new line, of 8-inch size, will parallel the existing 6-inch pipe line between the Crystal field and Mount Pleasant and will make possible the elimination of three of the four existing booster stations along the route. It will increase from 21,000 to 24,000 bbls. the volume of crude deliverable daily to the Toledo refineries from the central Michigan oil fields.

Pipe Line May Be Laid if Freight Rate is Increased

NEW ORLEANS, La.—Dr. Walter M. W. Splawn, chairman of the Interstate Commerce Commission, was told by oil men that a proposed 15 per cent increase in railroad freight rates would cause additional construction of pipe lines.

A. G. Talbot of Chicago, representing the petroleum exchange, asserted that if the rail freight increase was approved the Cosden Petroleum Corp. of Big Spring, Tex., would find it necessary to install pipe lines "or go out of business."

W. D. Richardson of Fort Worth, Tex., vice president of the Cosdon corporation, followed with testimony that it could not afford to pay the increased rail rates.

He and C. L. Mayhall of Oklahoma City, representing Anderson-Prichard Oil Co., said that oil firms were considering a joint pipe line project from Big Spring to Corpus Christi, Houston or other Texas points should the rail rates be increased.

In Buckeye oil field, Michigan

en, Oklahoma Natural Gas Co., Tulsa, vice chairman; Irving D. Ross, Peoples Natural Gas Co., Pittsburgh, Pa.; John P. Brosius, Equitable Gas Co., Pittsburgh, Pa.; W. F. Miller, Public Service Co. of northern Illinois, Maywood, Ill.; Joseph F. Quinn, Brooklyn Union Gas Co., Brooklyn, N. Y.; Thomas E. Wood, Manufacturers Light & Heat Co., Pittsburgh, Pa.; O. C. Warren, Birmingham Gas Co., Birmingham, Ala.; and Charles W. Gale, Knoxville Gas Co., Knoxville, Tenn.

Among the subjects that will be covered by papers or symposiums are: Soft metals, kilns, nonferrous furnaces, food manufacturing, temperature controls, propane and butane competition, forging and glass melting.

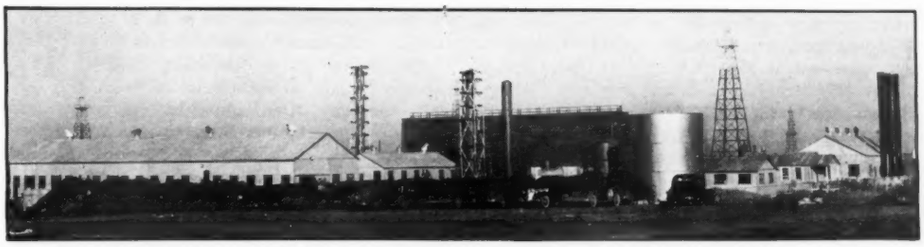
New York and Pennsylvania Gas Fields Operation

COUDERSPORT, Pa., Jan. 17.—One well was completed and four new locations announced, three of them wildcat tests, in the New York-Pennsylvania deep sand gas fields during the week ended January 14. Release of the new locations indicate predictions of a widespread wildcatting campaign for new Oriskany or Medina sand gas production in 1938 in this area were well founded.

New York State Natural Gas Co. completed a test well on the A. Schaul farm in Troupsburg Township, Steuben County, New York, where production was developed for the first time last year. This test, completed at 5,026½ feet on January 10, had an initial open flow of 2,200,000 feet per day. This test topped the Oriskany sand at 5,010 feet and had an initial rock pressure of 1,935 pounds.

Each of the four new locations, three in New York and the other in Pennsylvania, were reported by the New York State Natural Gas Co.

Natural Gasoline



CONTINENTAL BILLINGS FIELD PLANT NEAR COMPLETION

Continental Oil Co.'s gasoline plant in the Billings pool of Oklahoma, now in the last stages of construction. The plant, of 20,000,000 feet daily gas capacity, will process gas from the wells of Continental, Tide Water Associated Oil Co. and other producers in the field. Sufficient machinery is included in the plant for repressuring operations and delivery of residue gas to distribution systems.

Natural Gasoline Production Decreased During November

The daily average production of natural gasoline for November, 1937, was 5,904,000 gallons, according to the monthly report prepared by the Bureau of Mines. This was 82,000 gallons below the average for October but 562,000 gallons, 10 per cent, above the average for November, 1936. The largest decreases were noted in East Texas, Seminole, and Oklahoma City districts. The Kettleman Hills field decreased from a production of 14,786,000 gallons in October to 14,590,000 gallons in November, while the Panhandle area showed a decrease of about 500,000 gallons.

Production of the various districts, in gallons, was as follows: Appalachian, 6,745,000; Illinois, Michigan, Kentucky, 1,260,000; Oklahoma, 42,016,000; Kansas, 5,107,000; Texas, 53,595,000; Louisiana, 9,061,000; Arkansas, 825,000; Rocky Mountain, 6,409,000; and California 52,096,000. For the 10-month period of 1937 production of the United States was 1,858,290,000 gallons as compared with 1,599,192,000 gallons in the like period of 1936.

Stocks of natural gasoline at refineries and at plants and terminals decreased 12,474,000 gallons in November, or from 228,648,000 gallons the first of the month to 216,174,000 gallons on November 30, 1937. Stocks at refineries declined from 119,364,000 to 112,140,000 gallons and those at plants and terminals from 109,284,000 to 104,034,000 gallons.

Shipments of natural to jobbers and retailers and exports totaled 23,184,000 gallons, or 29 per cent less than in October. The decline was entirely in exports as shipments to jobbers and retailers remained the same, 11,760,000 gallons. Vapor pressures of shipments to refineries and refinery-owned bulk plants increased and shipments to jobbers and exports decreased, but the weighted average vapor pressure continued to increase. The average vapor pressure for November was 21.3 pounds, compared with 20.5 pounds in October.

Refinery Expansion

Richfield Receives Gasoline Contract From Government

LOS ANGELES, Calif.—Richfield Oil Corp. has been awarded a contract for 3,051,000 gallons of gasoline to be supplied to the United States government during the first three months of 1938. Total cost of the gasoline to be supplied by Richfield is estimated at approximately $450,000. The government requested bids covering gasoline requirements totaling 5,500,000 gallons of which the Richfield contract represents over 55 per cent. The contract includes all three grades of gasoline manufactured by the company.

Imperial Oil Refinery at Coutts, Alberta, Closed

COUTTS, Alberta.—The skeleton crew retained by Imperial Oil, Ltd., at its Maple Leaf refinery here since the plant ceased operations are being withdrawn. For the time being the plant will be left idle, pending arrangements for disposal.

Bureau of Mines Reports on Motor Gasoline Survey

The Bureau of Mines has issued a report (R. I. 3374) the fourth in a series, on properties of commercial motor fuel. The report covers 63 brands of gasoline represented by 1,136 samples excluding the Pacific Coast. Those from the Pacific Coast were averaged by the Pacific Coast technical group before being submitted and are published exactly as they were submitted. The following discussion of results is taken from the fore part of the report:

"The octane ratings of the regular and premium grades of gasoline indicate about the same range as during the summer of 1936. The third-grade gasolines have a slightly broader range in the present survey.

"The range of vapor pressures of 90 per cent of the regular gasolines is 6.4 to 8.7 pounds, and that of 90 per cent of the premium-price gasolines is 5.8 to 8.3 pounds, both of which are narrower than for the summer of 1936. The lower range of vapor pressures of the premium-price gasolines is accompanied by a slight but definitely lower range of distillation temperatures.

"The data of this survey are similar to corresponding figures reported in the survey for the summer of 1936. In general, no definite tendencies in change of characteristics are evident. The four surveys in this series indicate that gasolines in the various price classifications fall into definite groups with respect to the characteristics reported in the surveys."

Lube Oil Corp. Completing New Michigan Refinery

ALMA, Mich.—Lube Oil Corp. is completing construction of its refinery acquired in the summer of 1937 from Wolverine Refining Co. A 700-bbl. vacuum unit is nearing completion and a 235-bbl. naphtha dewaxing unit and a 200-bbl. propane dewaxing unit are under construction.

Construction of New Raton Field Refinery Completed

FORT WORTH, Tex.—F. H. Patton & Sons have completed construction of their refinery in the Rotan field of Fisher County, West Central Texas. The new plant will handle about 800 bbls. daily of Rotan crude which they have under contract from Sunray Oil Co. properties in the field. This is the first outlet at Rotan since Shell Pipe Line Co. disconnected their connection several weeks ago. There is now about 15,000 bbls. of crude in storage in the field. The Patton refinery which was moved to Rotan was formerly located and operated at Post, Tex., and refined Garza County crude while there.

New Flour Bluff Gasoline Plant Started by Humble

CORPUS CHRISTI, Tex.—Operations of Humble Oil & Refining Co.'s new natural gasoline plant in the Flour Bluff field, Nueces County, Texas, was started the past week. The plant has a capacity of 20,000,000 feet of gas daily. With this volume of gas from 10,000 to 12,000 gallons of gasoline will be recovered daily.

Gilmore-Dabney, Inc., Gasoline Plant at Signal Hill Sold

LOS ANGELES, Calif.—Wilmington Gasoline Co., headed by William C. McDuffie, former receiver for Richfield Oil Co., has purchased a natural gasoline plant from Gilmore-Dabney, Inc., and will move it to the new Long Beach Harbor field. The plant, at present located on Signal Hill, will process gas production from properties of the Southern California Edison Co. It may also process gas from several other companies. Gas handling capacity of the absorption type plant is 8,000,000 cubic feet daily, from which it is expected to extract some 30,000 gallons daily.

PROVIDENCE, R. I.—At the request of Gov. Robert E. Quinn, a bill was introduced in the state senate which seeks to place the gasoline business in the same category as public utilities.

MADISON

(Continued from Page 31)

440,712 gallons, or 17 per cent, and of the sales by all 29 independents in the Mid-Continent area that year, totaling 903,296,529 gallons, only 93,394,727 were to defendants. In 1936, he said, the defendant companies bought 80,234,458 gallons, or 19 per cent of the 416,923,200 gallons sold by the 14 Mid-Continent refiners named as "dancing partners" and 109,378,261 gallons, or 10.89 per cent of the 1,004,006,200 gallons sold by all Mid-Continent independents that year.

Just before the defense rested its case, Judge Stone admitted in evidence portions of the 1935 report by Harold L. Ickes, petroleum code administrator.

Ickes' Report

"The operations of the tender board, of the production provisions of the code and the refinery amendment," said that portion of the report read to the jury, "and of the stabilization committee of the Planning and Coordination Committee with the cooperation of the Petroleum Administration Board, brought the desired parity between the wholesale price of gasoline and crude oil in the spring of 1935. The work of the stabilization committee contributed very largely to the elimination of excessive marketing abuses which tended to keep the retail markets in an unsettled and unstable condition.

"One of the difficult marketing problems of the year revolved around the question of price differentials as between different types of marketers. The stabilization committee, authorized by the administrator in July, 1934, was successful in resolving many localized conflicts and in compromising issues which had brought on drastic price wars to the injury of many marketers caught in between the warring factions. Before the end of the winter markets generally throughout the Mid-Continent and eastern areas were fairly stable, and at the time of the invalidation of the code at the beginning of the high-consuming season, the industry as a whole had reached stability in markets, an even balance between production and demand in the case of both crude and gasoline, had achieved the best statistical position in many years, and entered upon a prosperous summer, which has, in fact, proved to be the highest-consuming season in the history of the oil industry. Production was under control throughout the nation with some minor exceptions, the wholesale price of gasoline was in parity with the current price of crude, the refinery amendment had brought a balance between the manufacture of gasoline and the needs of the nation therefor, the Connally act had succeeded as the original tender board had previously succeeded, in protecting interstate commerce from 'hot' oil or gasoline and markets were generally stable."

After W. J. Miller, chief of the prosecution's accounting staff, had taken the stand to dispute the contentions of James D. Miller, the government called two reserve witnesses, T. R. Vaughn, Chicago independent marketer, and Adolph H. Sus, Chicago, central district manager of Sinclair Refining Co., and author of what had become known as the "Sus memorandum," but which had not been produced in evidence when the prosecution rested its direct case.

Vaughn told of a telephone conversation overheard, he said, on September 18, 1935, in the Chicago office of Globe Oil & Refining Co., and a defense protest of "hearsay" failed to halt his narrative.

Sus was summoned on rebuttal to identify the memorandum he had prepared for his superiors describing a meeting in Chicago on February 11, 1935. It was a general stabilization meeting, he said, attended by 40 or 50 persons.

"Was there another smaller meeting at which about a dozen were present?" asked Hammond E. Chaffetz, of the prosecution.

"Yes, sir," Sus replied, explaining later that the group present consisted of R. W. McDowell's tankcar stabilization committee and a few others.

The matter under discussion, said his memorandum, which had been taken from the Sinclair company files, consisted of "ways and means of maintaining a strong, active tankcar market." The plan proposed removal of East Texas surplus gasoline so it would not be a disturbing influence in the Mid-Continent market, and involved 14 major companies, each of which was to select one or more small refiners and "obligate itself" to take whatever surplus these companies might have from time to time, it continued. The program as described was to include a "steering committee" to "guide and control" periodically the prices to be paid in such purchases.

The plan, according to the memorandum, was expected to have a better chance of success than previous programs because of the methods to be followed by the "steering committee" and the fact that the buying would be on a "rising market," and each delivery of gasoline was to be reported in the journals as an "individual sale."

Cross-examined by Attorney Wood of Sinclair, Sus declared his memorandum did not purport to be a verbatim report of what transpired at the Chicago meeting, and no formal report was made by anybody. It was merely a discussion, with McDowell presiding, he said. Called upon to explain the memorandum in detail, he related much the same version as that given by McDowell, C. E. Arnott and other defense witnesses, declaring the "steering committee" was not actually to "fix" any price, but to see that the majors paid a "fair going market price" and did not "chisel" on the small refiners.

No Price Fixing

"Was anything said as to the quantities of gasoline to be purchased?" Wood asked.

"It was said only that each company would buy all it 'advantageously could use,'" Sus replied.

"Was there any recommendation that this committee fix the price?"

"No, sir."

On redirect examination, Sus explained to Chaffetz that "guide and control" meant to "lead and influence."

Chaffetz asked what he meant in his memorandum by reporting a statement at the meeting that purchases contemplated in the plan would be equivalent only to "curtailing our own production by 2 per cent."

The only statement made, Sus replied, was that the small amount to be purchased would be equivalent to only 2 per cent of the refining capacity of the companies mentioned.

Before Vaughn and Sus were called, the government's Miller had testified in contradiction of tabulations by the defense's Miller tending to show that the great majority of third-grade gasoline purchases by the major companies were at prices below or at the market. W. J. Miller testified that out of 47 purchases from Danciger Refining Co. shown on J. D. Miller's chart as third-grade gasoline bought at prices under the low, 40 involved gasoline that was superior to third-grade gasoline and commanded a better price. He believed at least three-fourths of the gasoline bought by the Globe company in 1935 and 1936 from Omar Refining Co., was sold at a loss or went into storage, in contradiction of the defense claim that no gasoline was bought other than actually needed. He said 249 cars bought by Sinclair from Root Petroleum Co. were purchased at prices above the "low."

Cross-examining Miller from the Danciger records, Col. W. J. Donovan called attention to many purchases, representing gasoline of 62 octane test, and pointed out that the trade journals quote third-grade as "62 octane and below" while the indictment describes third-grade gasoline as anything below 65 octane. Donovan contended therefore the purchases were properly shown on J. D. Miller's chart.

W. J. Miller, however, insisted this gasoline was of a special grade manufactured by Danciger to sell at prices one-eighth to one-quarter of a cent higher than its price for third-grade.

Donovan pointed out, in regard to the Globe purchases, that the company was compelled to sell gasoline at a loss sometimes because of guaranteed margins to jobber customers and had to purchase supplies for delivery on contract at times when it did not have the refinery capacity to meet its demand.

Frederick Wood, of Sinclair, charged the government's Miller had used the wrong freight basis in his price comparisons. Miller admitted he did not take freight rates into consideration. If he had used the right comparison, Wood charged, he would have found that every car bought from Root was below the low.

The government concluded its rebuttal with the introduction of several documents, including a "price review" memorandum from P. E. Lakin of the Shell corporation to its president, Alexander Fraser. The memo, June 7, 1935, reported the gasoline market was firm despite suspension of stabilization activities by the tankcar committee following invalidation of the NRA, but major companies had "arranged" to take surplus material off the market and there was no immediate apprehension because specific arrangements had been made to relieve Simms Petroleum Co. of a current surplus.

A letter from J. F. Nagle of Skelly to A. H. Prendergast of Kansas City, on September 11, 1935, reported delayed shipments would "check out" one refiner as far as further purchases were concerned and referred to a specific shipment as "a purchase we made upon request of the buying committee."

Another letter from W. T. Atkins, vice president of Skelly, on December 23, 1935, instructed Nagle to "check allocations" of Russell Refining Co., and ascertain "who is delegated to take this surplus." The letter said Atkins had "hoped" this refiner's runs might be reduced in line with "the program committee" and added he did not "wish to be a guardian for any further refiners." It suggested the matter be discussed with A. V. Bourque, secretary of the Western Petroleum Refiners Association.

Brown L. Meese, of Globe, was called in surrebuttal by the defense to answer Vaughn's testimony, which he labeled an "absolute falsehood."

OBITUARIES

C. H. DOOLITTLE, retired oil operator, died at his home in Mansfield, La., January 12. A native of Pennsylvania, he moved to Mansfield in 1912.

E. H. McLEOD, 51, pioneer oil operator, died at Okotoks, Alberta, recently. Mr. McLeod was associated with Turner Valley oil development for many years, and succeeded his father, the late W. E. McLeod, as president of McLeod Oil Co. He was largely responsible for the drilling in 1932 of McLeod Oil Co. No. 4, which established a depth record of 7,750 feet.

JOHN T. COCHRANE, president of Coastal Petroleum Co., died at his home in Mobile, Ala., of heart attack, January 12.

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Crude Oil and Refined Summary for First Eleven Months of 1936-1937

The daily average production of crude petroleum in November, 1937, was 3,473,500 bbls.; this was 104,300 bbls. below the average of October. This marked the second successive deline of about 100,000 bbls. in daily average production.

Crude runs also declined, though not as much as production, consequently more oil was taken from stocks. The withdrawal from refinable crude stocks in November was 2,725,000 bbls., or more than double the withdrawal in October.

The indicated domestic demand for motor fuel in November was 42,666,000 bbls., or 7 per cent above the final figure for November, 1936. Exports of motor fuel were 3,309,000 bbls., considerably below the October figure but materially higher than exports a year ago. Stocks of gasoline were increased by 2,591,000 bbls., reaching a total of 70,628,000 bbls. on November 30.

According to data of the Bureau of Labor Statistics, the price index for petroleum products in November, 1937, was 61.7, the same as in October, but 3.6 higher than the index of a year ago.

United States Supply and Demand—Crude Oil (Bbls.)

Eleven months—	Total supply	Total demand	Excess Demand	Excess Pct.	Domestic production	Imports	Indicated domestic demand‡	Exports	Stocks refinable crude Nov. 30
1937	1,196,166,000	1,178,603,000	*17,563,000	*1.5	1,171,074,000	25,092,000	1,116,433,000	62,170,000	305,747,000
Daily average	3,581,000	3,529,000	53,000	....	3,506,000	75,000	3,342,000	186,000	.....
1936	1,030,577,000	1,056,210,000	25,633,000	2.4	1,000,864,000	29,713,000	1,009,692,000	46,518,000	288,998,000
Daily average	3,086,000	3,162,000	77,000	....	2,997,000	87,000	3,023,000	139,000	.....
Increase, 1937	165,589,000	122,393,000	.....	....	170,210,000	†4,621,000	106,741,000	15,652,000	16,749,000
	16.1%	11.6%	.....	....	17.0%	†15.6%	10.6%	33.6%	5.8%

Supply and Demand—Refinery Products—Motor Fuels (Bbls.)

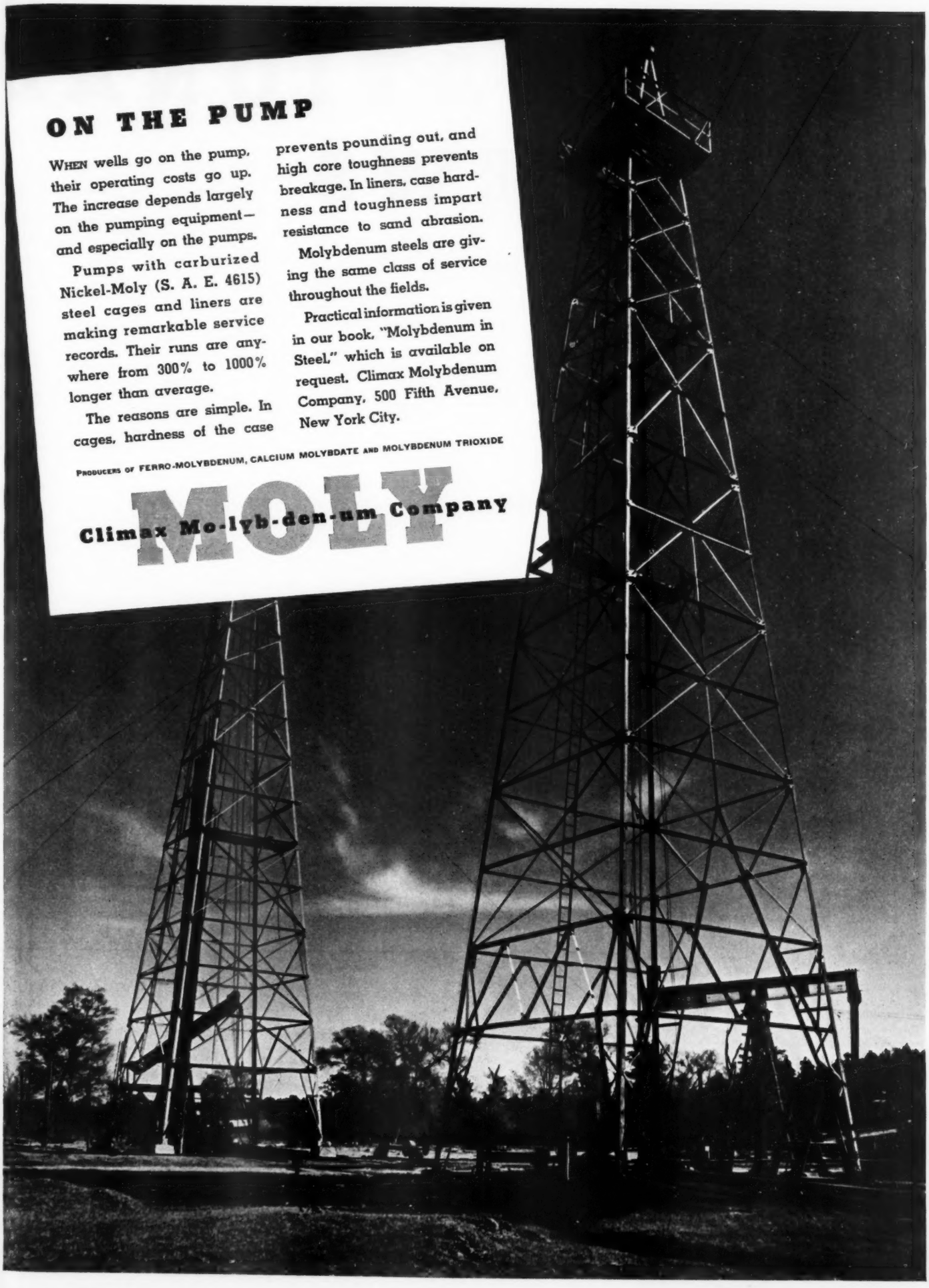
Eleven months—	Total supply	Total demand	Excess Demand	Excess Pct.	Domestic production	Imports	Domestic demand	Exports	Stocks Nov. 30§
1937	523,350,000	514,880,000	*8,470,000	*1.6	523,350,000	.....	479,303,000	35,577,000	75,775,000
Daily average	1,567,000	1,542,000	.....	....	1,567,000	.....	1,435,000	107,000	.....
1936	470,241,000	467,924,000	*2,317,000	*.5	470,241,000	.....	442,198,000	25,726,000	62,952,000
Daily average	1,408,000	1,401,000	.....	....	1,408,000	.....	1,324,000	77,000	.....
Increase, 1937	53,109,000	46,956,000	.....	....	53,109,000	.....	37,105,000	9,851,000	12,823,000
	11.3%	10.0%	.....	....	11.3%	.....	8.4%	38.3%	20.4%
Eleven months—				**Kerosene**					
1937	59,499,000	56,775,000	*2,724,000	*4.8	59,499,000	.....	48,531,000	8,244,000	8,357,000
1936	50,582,000	51,532,000	95,000	1.8	50,582,000	.....	45,331,000	6,201,000	6,966,000
Increase, 1937	8,917,000	5,243,000	.....	....	8,917,000	.....	3,200,000	2,043,000	1,391,000
	17.6%	10.2%	.....	....	17.6%	.....	7.1%	32.9%	20.0%
Eleven months—				**Gas Oil, Distillate Fuels and Residual Fuel Oils¶**					
1937	453,745,000	440,686,000	*13,059,000	*3.0	432,077,000	21,668,000	398,350,000	42,336,000	120,077,000
1936	405,379,000	397,858,000	*7,521,000	*1.9	388,257,000	17,122,000	366,499,000	31,359,000	111,505,000
Increase, 1937	48,366,000	42,828,000	.....	....	43,820,000	4,546,000	31,851,000	10,977,000	8,572,000
	11.9%	10.8%	.....	....	11.4%	26.6%	8.7%	35.0%	7.7%
Eleven months—				**Gas Oil and Distillate Fuels**					
1937	133,685,000	129,552,000	*4,133,000	*3.2	133,143,000	542,000	101,549,000	28,003,000	26,852,000
1936	114,188,000	107,704,000	*6,484,000	*6.2	113,775,000	413,000	89,302,000	18,402,000	26,414,000
Increase, 1937	19,497,000	21,848,000	.....	....	19,368,000	129,000	12,247,000	9,601,000	438,000
	17.7%	20.3%	.....	....	17.0%	.....	13.7%	52.2%	1.7%
Eleven months—				**Residual Fuel Oils**					
1937	320,060,000	311,134,000	*8,926,000	*2.9	298,934,000	21,126,000	296,801,000	14,333,000	93,225,000
1936	291,191,000	290,154,000	*1,037,000	*.4	274,482,000	16,709,000	277,197,000	12,957,000	85,091,000
Increase, 1937	28,869,000	20,980,000	.....	....	24,452,000	4,417,000	19,604,000	1,376,000	8,134,000
	9.9%	7.2%	.....	....	8.9%	26.4%	7.1%	10.6%	9.6%
Eleven months—				**Lubricating Oils**					
1937	32,385,000	31,963,000	*422,000	*1.3	32,385,000	.....	21,885,000	10,078,000	6,907,000
1936	28,138,000	28,538,000	400,000	1.4	28,138,000	.....	20,855,000	7,683,000	6,628,000
Increase, 1937	4,247,000	3,425,000	.....	....	4,247,000	.....	1,030,000	2,395,000	279,000
	15.1%	12.0%	.....	....	15.1%	.....	4.9%	31.2%	4.2%
Eleven months—				**Petroleum Wax (Lbs.)**					
1937	509,606,000	480,373,000	*29,233,000	*6.1	478,240,000	31,366,000	270,866,000	209,507,000	139,867,000
1936	447,701,000	443,069,000	*4,632,000	*1.1	431,760,000	15,941,000	273,052,000	170,017,000	119,307,000
Increase, 1937	61,905,000	37,304,000	.....	....	46,480,000	15,425,000	†2,186,000	39,490,000	20,560,000
	13.8%	8.4%	.....	....	10.8%	96.8%	†.8%	23.2%	17.2%

*Excess supply. †Decrease. ‡Crude oil only. §Includes finished and unfinished refinery gasoline and natural gasolines. ¶Gas oil and fuel oil equals gas oil and distillate fuels plus residual fuel oils. Note: Total supply equals domestic production plus imports. Total demand equals domestic demand plus exports. Data on demand for refined products are based on refinery shipments.

Crude Oil Run to Stills and Total All Oils (Bbls.)

Eleven months—	Total imports§	Total exports§	Total crude to stills	Per cent yield gasoline‡	Nat. gasoline production	Total supply all oils*	Total demand all oils*	Stocks all oils Nov. 30
1937	52,545,000	160,264,000	1,085,077,000	47.1	44,245,000	1,270,499,000	1,227,478,000	561,667,000
Daily average	157,000	480,000	3,249,000	....	132,000	3,804,000	3,675,000	1,682,000
1936	52,098,000	119,844,000	975,083,000	47.2	38,076,000	1,093,329,000	1,112,756,000	522,273,000
Daily average	156,000	359,000	2,922,000	....	114,000	3,273,000	3,332,000	1,564,000
Increase, 1937	447,000	40,420,000	109,994,000	....	6,169,000	177,170,000	114,722,000	39,394,000
	.9%	33.7%	11.3%	....	16.2%	16.2%	10.3%	7.5%

*Total all oils includes crude and refined products, natural gasoline and benzol. †Decrease. ‡Includes natural gasoline blended at refineries. §Includes crude oil and refinery products. In case of imports includes receipts in bond and for domestic use. All data based on Bureau of Mines reports.


ON THE PUMP
When wells go on the pump, their operating costs go up. The increase depends largely on the pumping equipment—and especially on the pumps.
Pumps with carburized Nickel-Moly (S. A. E. 4615) steel cages and liners are making remarkable service records. Their runs are anywhere from 300% to 1000% longer than average.
The reasons are simple. In cages, hardness of the case prevents pounding out, and high core toughness prevents breakage. In liners, case hardness and toughness impart resistance to sand abrasion.
Molybdenum steels are giving the same class of service throughout the fields.
Practical information is given in our book, "Molybdenum in Steel," which is available on request. Climax Molybdenum Company, 500 Fifth Avenue, New York City.
Producers of FERRO-MOLYBDENUM, CALCIUM MOLYBDATE and MOLYBDENUM TRIOXIDE
MOLY
Climax Mo-lyb-den-um Company

INTERNATIONAL NEWS

Special Committee Reports on Argentina Petroleum Industry

A special committee appointed to study the petroleum industry in Argentina has submitted its report to the president of the republic and suggests among other things that the entire business be declared a public utility subject to regulation by a National Petroleum Council The general provisions suggest that all machinery, installations, merchandise and other property or fixed assets of any kind pertaining to the national supplying of petroleum be declared a public utility and subject to expropriation as provided for in the law.

Yacimientos Petroliferos Fiscales (the government owned company) is authorized to absorb up to 50 per cent of the total volume of operations relating to the supplying of the country with petroleum, while the remaining 50 per cent would be divided equally between mixed and private companies.

Only recently an agreement was reached between the Y.P.F. and private oil companies in Argentina setting sales quotas to run for a period of four years.

Standard Oil Co. of New Jersey and Shell subsidiaries are the principal private companies operating in Argentina.

Venezuela Production Slightly Less During December

Venezuelan crude oil production tapered off again in December closing 1937 with two successive recessions in the last two months of the old year. Yield dropped to 541,062 bbls. daily in December, compared with 543,942 bbls. in November. Compared to 1936, however, December's production of 16,772,772 bbls. was 7,046,475 bbls. higher but during December, 1936, Lake Maracaibo fields were partially shut-in due to a labor strike.

The decline in production registered in November and again in December was a reflection of the reduced demand for Venezuelan crude which had been geared during September and October to a pace commensurate with the brisk fuel oil demand existing at the moment.

The newly exploited Tia Juana field shows a loss of about 172,000 bbls. in December production compared with November, but this is not a true reflection since Standard Oil Co. of New Jersey's subsidiary, Lago, groups its Tia Juana output with Lagunillas for preliminary totals. An increase of about 52,000 bbls. was reported for La Rosa but Lagunillas, including Lago's Tia Juana output, dropped about 93,000 bbls. for the month.

The Tarra field, operated by Colon Development Co. Ltd., continued its late 1937 rally in December accounting for output of 402,906 bbls. for the month compared to 368,235 bbls. in November. The Pedernales field in eastern Venezuela produced about 17,000 bbls. more crude in December than in the preceding month and Quiriquire, also in the eastern part of the country, extended its December output over November by about 48,000 bbls.

Since December contained one more day than November, the gain in daily average for those fields reporting greater total production was in most instances slight.

Colon Development's increased production in the Tarra field is being made possible by a repair program. During December, the company reconditioned its No. T-44 Tarra and the well flowed at the initial rate of 425 bbls. per day.

Venezuela Oil Concessions is also showing results of its renewed activity in the La Paz district where production in December, 1937, totaled 88,690 bbls. whereas a year ago the field's output had dropped to 11,500 bbls. Despite failure of Venezuelan fields and operators to maintain their September and October production rates through the last two months of the year, the country concluded 1937 with a net gain of more than 30,000,000 bbls. over 1936. It appears unlikely January production will be materially changed from December, but another gain for 1938 is practically assured by development programs adopted by the large operators with a sprinkling of drilling activity from the small companies or groups holding concessions in various parts of the country. The December, 1937, production figures by fields and companies are shown in the following table:

VENEZUELAN PRODUCTION—IN BARRELS

By Fields

	December 1937	Daily average December	December 1936
Lagunillas	7,897,752	254,764	4,825,759
Tia Juana	2,102,764	67,830	
La Rosa-Ambrosia	2,285,077	73,711	1,372,474
Quiriquire	2,189,503	70,628	1,778,462
Mene Grande	1,305,126	42,101	1,029,400
Tarra	402,906	12,997	307,000
Cumarebo	191,857	6,189	224,355
Pedernales	159,328	5,140	52,127
Concepcion	85,413	2,755	72,600
La Paz	88,690	2,861	11,500
El Mene	64,356	2,076	52,620
Total	16,772,772	541,062	9,726,297
Dly. avg. Nov. 1937	543,942		
Totals, Nov. 1937	16,862.185		

By Companies

Lago Petroleum	5,038,759	162,542	2,637,597
Venezuela Oil Concessions	5,360,686	172,926	2,844,300
Standard of Venezuela*	2,897,568	93,471	2,208,291
Mene Grande Oil Co.	1,665,000	53,711	591,000
Caribbean Petroleum Co.	1,305,126	42,101	1,029,400
Colon Development Co.	402,906	12,997	307,000
British Controlled Oilfields	64,356	2,076	52,620
North Venezuela Pet.	38,371	1,238	56,089
Totals	16,772,772	541,062	9,726,297

*Includes Creole's shore in Lagunillos and La Rosa.

Foreign Exchange Difficulties With Rumania Affect Imports

Shifts in petroleum imports by European nations because of foreign exchange difficulties with Rumania are clearly shown in the case of Austria.

Crude oil imports by Austria during the first 10 months of 1937 amounted to 646,091 quintals against 1,490,000 quintals during the same period a year ago.

While in 1936 Rumania was the only source of supply, only 302,500 quintals, or less than 50 per cent of the total imports originated in Rumania in 1937. For 10 months of 1937, Central America supplied 174,024 quintals, Italy 144,700 quintals and the United States 19,990 quintals.

Gasoline imports by Austria during the first 10 months of 1937 totaled 735,320 quintals, against 489,096 in 1936. The United States supplied 80,960 quintals of the gasoline in the 10 months of 1937 compared to none for the 1936 period.

Italian Geologists to Survey Oil Prospects in Ethiopia

Two additional geological committees have been formed by Azienda Generale Italiana Petrolio to investigate oil prospects in East Africa, according to a report from the Department of Commerce trade office in Rome, Italy. The first group is headed by Professor Gortani, director of the geological institute of the University of Bologna. Professor Bianchi, of the University of Padua, is on the Gortani committee which will investigate possibilities in southern Dankalia and complete surveys in Hararino. The other two groups, headed by Ing. Migliorini, geologist of the A.G.I.P., will continue research in Somaliland and Ogaden.

The geological parties have departed from Italy and are traveling with a full compliment of equipment including facilities for aerial photography.

Czechoslovakia Crude Output Gains 25 Per Cent in Year

Crude oil production in Czechoslovakia during November, 1937, totaled 12,234 bbls. an increase of 12.5 per cent over the October output and 25.2 per cent higher than for November, 1936.

October, 1937, crude production in the country was 11,071 bbls. while in November, 1936, the yield totaled 9,775 bbls.

Natural gas production in November, 1937, amounted to 130,879 cubic meters, or a drop of 4.3 per cent as against 136,714 cubic meters in October, 1937, but a gain of 16.9 per cent as compared with 111,956 cubic meters in November, 1936.

Fuel Oil Prices Top Gasoline In Italian East Africa

Fuel oil is more precious in Italian East Africa than gasoline. In a schedule of prices by which private firms may obtain petroleum products from the Italian military deposits in parts of Italian East Africa where Azienda Generale Italiana Petroli has no organization, fuel oil is quoted at 575 lire per quintal compared to 445 lire per quintal for gasoline. Naphtha is offered by A.G.I.P. at 415 lire per quintal.

Electric generating plant of YPF in Comodoro Rivadavia supplying power for drilling and pumping in this Argentine government field

New Train Will Provide Improved Connections to Oil Fields

An important transportation link to oil men operating in the Mid-Continent will be inaugurated effective January 23 which is designed to bring the various oil fields of Texas, Louisiana, Oklahoma, Arkansas and Kansas into closer proximity with the general offices of oil companies in the larger cities in these states.

The Frisco Railroad, in conjunction with the Missouri-Kansas and Texas Railroad, is on that date starting a new train to be known as "The Black Gold" which will supply the missing link from Texas points to Oklahoma and vice versa. This new train is to carry a diner, lounge car, modern pullman equipment and, in the very near future, will be pulled by a new streamlined locomotive which is now being arranged for.

Of particular importance to oil men operating out of Tulsa, is the fact that this train now makes overnight connection with all principal oil fields in Texas and Louisiana. The train will operate as a nonstop train between Tulsa, Dallas and Fort Worth, leaving Tulsa at 2:45 p.m. daily and arriving in Dallas at 10:10 p.m. and in Fort Worth at 10 p.m. The train will carry a through pullman or pullmans from Tulsa to Houston with arrival in Houston at 7:45 a.m. This saves considerable time over the present railroad schedules and avoids any change at Dallas or Fort Worth.

At Fort Worth, with arrival at 10 p.m., connections are made for West Texas on the Texas and Pacific Railroad which leaves Fort Worth at 10:20 p.m. This is a 20-minute connection and the arrival time in Sweetwater is 4:40 a.m., Midland 8:45 a.m., Odessa 9:19 a.m., Monahans 10:08 a.m. and El Paso 4:30 p.m.

At Fort Worth, this train also makes connections for Wichita Falls, arriving there at 1:38 a.m. and Amarillo at 7:35 a.m.

At Dallas, the new train makes connections which arrive in Austin at 4:30 a.m. with a set-out sleeper which can be occupied until 8 a.m.

The arrival in San Antonio is 7 a.m. with a set-out sleeper and connections there can be made for Corpus Christi with arrival at 12:15 p.m. Shreveport, La., is also made accessible with a change at Dallas and arrival in Shreveport at 5:20 a.m. with a set-out sleeper which can be occupied until 7:30 a.m. and New Orleans, 4:40 p.m.

For those wishing to come to Tulsa and points north, the new train will leave Dallas at 4 p.m. with arrival at Tulsa 11:30 p.m. where connections can be made for the north and east that same night.

East Texas A.P.I. Chapter to Meet At Kilgore February 15

The next meeting of the East Texas Chapter of the American Petroleum Institute, Division of Production, will be held in the high school auditorium at Kilgore, Tex., Tuesday evening, February 15.

The program will include discussion of "The Prevention and Treatment of Emulsions in the East Texas Field," by B. M. Givens, of Sun Oil Co. The second paper will be by F. G. Beckman on "The Completion of Wells in the East Texas Field by the Reverse Circulation Method." Following these discussions the Safety Team of the Empire Pipe Line Co. at Gladewater will put on a short demonstration. Preceding the meeting an informal dinner will be held at the Kilgore Hotel at 6:30 p.m.

Sunray Acquires Interests Of California Operator

LOS ANGELES, Jan. 17.—Sunray Oil Co. became an active operator and producer in California today through acquisition of the F. C. Hall, Inc., interests in 65 producing wells in the Wilmington and El Segundo fields, according to an announcement by C. H. Wright, president of Sunray.

Sunray will immediately start further drilling in the Wilmington area with an additional eight wells scheduled for the next six months. Sunray is principally a producing company with a majority of its holdings located in Oklahoma, Texas and Kansas, with headquarters in Tulsa.

New Exhibit Building for Exposition is Dedicated

Formal dedication services, at which the new exhibit building was named, were held last week on the grounds of the tenth International Petroleum Exposition at Tulsa, in honor of the $250,000 new building program now in progress for the May 14-to-21 oil show.

Union Gas Co. Operations in Southwestern Ontario

CHATHAM, Ontario.—Steady expansion since, in 1912, it merged a number of smaller companies has marked the operations of Union Gas Co. of Canada. The company produces, transmits and distributes natural gas throughout a large part of the southwestern Ontario Peninsula, serving nearly 50 communities including Chatham, Sarnia, London, Hamilton, Windsor, Wallaceburg, Petrolia, Ridgetown and Tilbury. Consumers served by the company and its subsidiaries exceed 50,000 and the resident population is more than 300,000. The company operates more than 400 producing wells in the Tilbury, DeClute, Dawn, Dover and Haldimand fields, with leases aggregating more than 100,000 acres. The company's transmission and distributing lines aggregate more than 1,900 miles.

Wage Contract Covering Tanker Workers Signed

A wage contract covering about 3,000 of the unlicensed personnel employed on 72 tankers of Standard Oil Co. of New Jersey was signed by the company in New York last week with the National Maritime Union which is now seeking affiliation with the C.I.O.

Wage increases of $5 to $10 monthly are granted under the contract. Provisions also include annual vacations of three weeks with pay for men employed continuously for 12 months and payment of overtime at a rate of 75 cents an hour.

THE MARKETS*

CRUDE OIL: *The crude market is somewhat unsettled pending the conference of governors of oil-producing states next Monday. Although talk of a reduction in Mid-Continent prices has been renewed, informed observers continue to predict there will be no cut. No changes in posted prices were announced in the past week.*

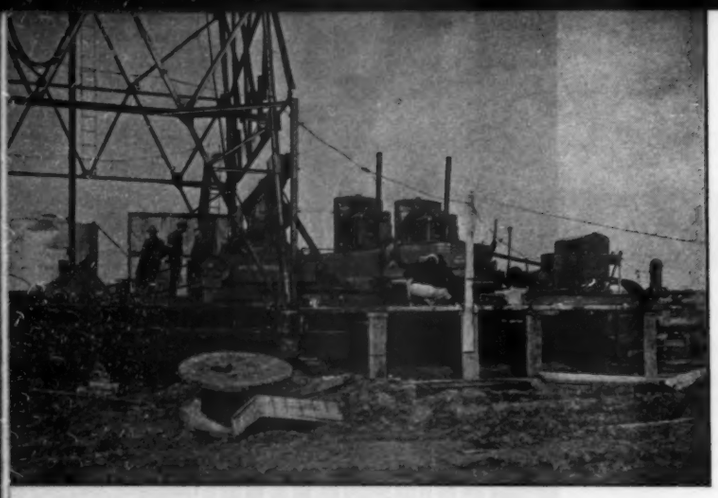
REFINERY: *Mounting gasoline stocks continue to keep that division weak. Prolonged open weather has caused light fuels to back up in some areas, weakening the price structure and causing some concern regarding stocks. Announcement that Standard of New Jersey will cut its runs 15,000 bbls. daily is encouraging hope other refiners will take corresponding steps.*

TANK-WAGON AND POSTED DEALER: *Standard of Kentucky made adjustments, which included both advances and decreases, in gasoline and kerosene.*

FINANCIAL: *Oil shares did better than the average of stocks for the week, and many issues revealed exceptional strength, including Gulf, Barnsdall, Pure and Tide Water Associated. Average for 30 stocks for week ending January 15: High, 31.03; low, 29.31; close, 30 30. Week ending January 8: High, 30.15; low, 27.38; close, 29.89.*

**Detailed information in market section.*

AND NOW YOU TURN TO THE K. M. A. SECTION



Rigging up gasoline engine-driven portable

K.M.A. Now One of Oil Fields in P

By MITCHELL TUCKER

WICHITA FALLS, Tex., Jan. 17. Operators in the K.M.A. field are not content with having established a 50,000-acre productive area during the past six months of intensive wildcatting on all sides of the old shallow producing field. At the present time five semiwildcat wells in all directions from the field are in or near the stage of completion, all of which are checking favorably. Should these five tests prove the persistence of the Kemp City lime pay section over the entire area, the established productive limits will more than double that at the present time.

Two miles northward from production, Joe A. Worshman No. 1 Waggoner, B.S.&F. Survey, is standardizing in preparation to drill the pay. Three miles farther north Rathke Oil Co. No. 1 Burnett H.T.&B. Survey, is nearing the testing stage. Geier Brothers & Jackson No. 1 Ancell, C. Roberts Survey, 3½ miles west of production, is showing for a producer while preparing to drill the Kemp City lime. Mason Oil Co. No. 1 T. F. Mitchell, Col. Tap Survey, at the north end of production, is testing and showing for a producer. This well is about midway between the two northern outpost producers located about 5 miles apart. Two miles southeast of production, E. J. Stump is attempting to make a producer out of his No. 1 Mary Bishop, L. Netherly Survey. This well looked to be dry during early stages of testing, but oil later rose a few hundred feet in the hole and indicated itself a small producer.

In addition to these important semiwildcats on all sides of the field there are 96 other active locations. Of these, 76 are either rigging up or drilling, and 20 are in the stages of completion. These locations upon which permits have been granted, but not yet started, total 20.

Allocation of production in the deep (below 3,600 feet) portion of K.M.A. has been made under the old order governing production of the entire North Texas district up until January 4. Under this rule, wells having a potential of 500 bbls. or greater were granted an allowable of 58 bbls. per day. Following a public hearing at Wichita Falls, and in line with the almost unanimous recommendations of operators in the field, the Texas Railroad Commission recently issued its first order for the deep field, which set up its production as a separate unit from the North Texas stripper wells.

Hereafter, the allocation of daily production to individual wells will be upon a 50 per cent acreage and 50 per cent potential basis. Restrictions are placed upon each factor, however. A 10-acre drilling pattern, or larger, was ordered by the commission (except where special exceptions are granted following Rule 37), with maximum allowable units on a one-well-to-20-acre basis. The 50 per cent potential factor in the allocation formula was qualified by limiting the potential of any well to a maximum of 500 bbls.

At the present time all but seven of the completions have an established potential greater than this figure, some several times that amount. The restricted potential maximum was imposed largely as an inducement to keep operators from taking too deep a penetration in the pay section in an effort to establish large and perhaps harmful potentials. In fact, as it now stands, the potential factor is practically the same as a per well factor.

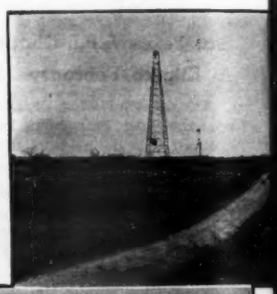
The accumulated production and rate of drilling, by years, throughout the entire life of K.M.A. (deep) is as follows:

Year—	No. wells	Annual production	Accumulated production
1931	2	26,415	26,415
1932	3	37,530	63,945
1933	3	55,945	119,890
1934	6	63,504	183,394
1935	9	74,789	258,183
1936	13	93,395	351,578
1937	89	671,511	1,023,089

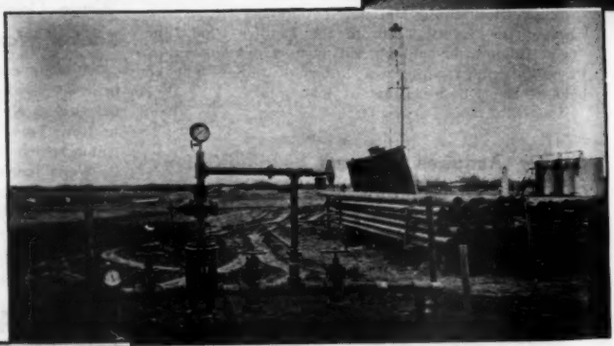
The fact that there are from 3,000 to 4,000 proven inside locations which will eventually be drilled, upon leases owned by 81 separate individuals or companies, indicates a rather rapid drilling campaign ahead, with an accompanying rapid rise in the rate of daily production. This is further borne out by the fact there is a very great demand for this high-grade crude oil, both by the four local refineries in the territory as well as by the five major pipe lines out of the field.

At present about 95 per cent of the field's entire production is being taken by the Texas Pipe Line Co. system. It is bunching the oil with its regular North Texas crude runs through its 6- and 8-inch parallel lines running from the field to Henryetta, thence Fort Worth, Dallas (connecting with its refinery there), then through East Texas field, Corsicana to Port Arthur.

West side K.M.A. f



Well hook-up, showing 650 pounds on casing, and 325 pounds flowing pressure on tubing



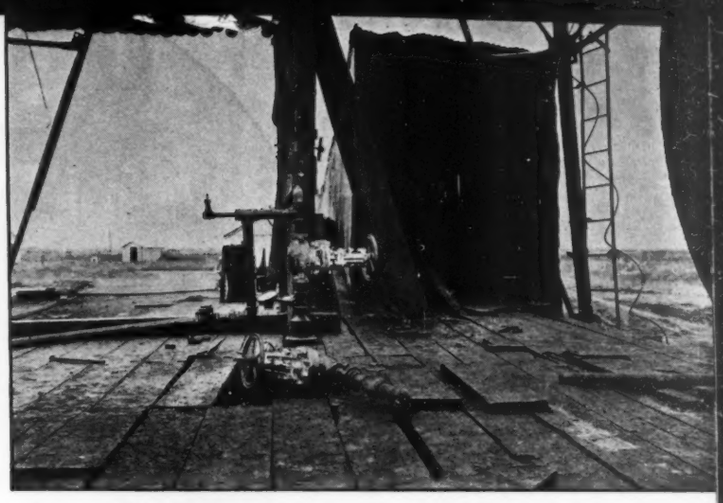
Taking bottom-hole pressure tests

Deep Oil Development Co. No. 1 Munger, discovery well in the deep K.M.A. field

Sinclair Prairie Pipe Line Co. is taking a small portion of the oil, moving it along with other North Texas crude through its 6-inch line south to the Ranger district, thence eastward in its West Texas system. Very little of the deep production has been refined by local Wichita Falls, plants, although it is in demand there at present.

Principal lease holders within proven limits of K.M.A. field follow: C. W. Boller, Panhandle Refining Co., Fain-McGaha Oil Corp., Deep Oil Development Co., King Oil Co., Consolidated Oil Co., Staley Oil Co., Sinclair Prairie Oil Co., Kadane, Inc., and others, E. H. Hamilton, Sunray Oil Co., Lebus and others, Texas Co., Magnolia Petroleum Co., E-C Oil Co., Ryan Consolidated Oil Co., Continental Oil Co., W. H. Hammon Oil Co., W. H. Bohner, L. T. Burns, W. B. Omohundro, Humble Oil & Refining Co., Hammon, Hanlon & Buchanan W. P. Ferguson, E. C. Norwood, Petroleum Producers Co., Shell Petroleum Corp. Atlantic Refining Co., Cata Oil Co., Co., R. Lee Kempner, Clyde Texas Oil Co., Burk Royalty Co., Bridwell Oil Co., J. G. Hammond, Inc.,

# of World's Largest Proven Area



Injection well being used in pressure maintenance project just started in center of K.M.A. field

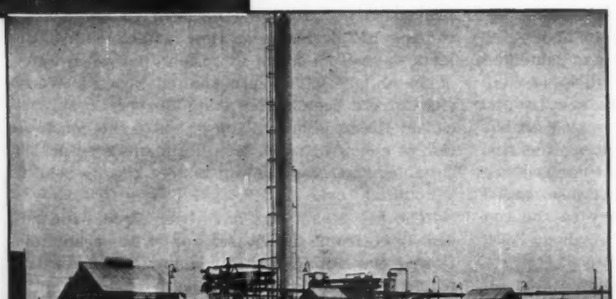
Perkins & Cullum, Melat & Graham, Showers & Moncrief, Golding & Cochran, E. J. Stump. Wheeler Nazro, Blackwell Oil & Gas Co., Manson Oil Co., Reed-Glass & Crenshaw, Geler Brothers, Inc., and others, Harrell & Eddleman, Fassett & Tuttle.

The statement has sometimes erroneously been made that no tests of the Ellenburger have yet been made on the K.M.A. deep structure. Deep Oil Development Co. No. 1 Munger was originally drilled in 1931 to a total depth of 5,430 feet and bottomed in the Ellenburger (Lower Ordovician) without favorable showings. It was plugged back and completed as the discovery well in the K.C. lime. This single well does not necessarily condemn all possibilities of deeper production at K.M.A., however.

M.A. field

Especially during the early development it was often thought there was very little continuity in the occurrence of pay zones throughout the 200-250-foot section of Kemp City lime. Considerable difference of opinion still exists both as to the age and lithological characteristics of the producing beds. Petroleum Producers Co. is now engaged in coring the first well in the field throughout the entire section, using a cable tool core barrel with drilling-in spudder for the work. First electrical log surveys are now being made experimentally in the field, and should add to the known data on the section.

Deep Oil Development Co. 1,500,-000-foot capacity high-pressure gasoline plant in K.M.A. field



Condensed logs of the K.C. lime in three typical wells in the approximate center of the field follow:

	Type numbers		
	1	2	3
Top gray lime (K.C.)	3,659	3,675	3,650
Top sandy oolitic lime showing oil	3,835	3,715-35	3,718-55
Saturated gray lime		3,745-3,810	
True sand, well saturated	3,846-68	3,810-63	3,810-46
Total depth	3,868	3,863	*3,874
Initial production, bbls. per day	1,120	2,000	1,540

*This well drilled through another saturated sandy lime from 3,863 feet to its total depth of 3,874 feet, where it went out of that formation into broken shale and lime. The lower saturated level carried considerable oil with showings of water.

It will be seen that what is termed the "true sand" horizon is the most uniform zone, and the greatest part of the production is coming from this level. If selective well completing is begun in this field, casing perforations will be made opposite this true sand.

Physical tests of pore space indicate from 8 to 13 per cent for the oolitic lime horizons, and approximately 24 per cent for the sandstone. Early measurements of permeability show more effective or interconnected pore space vertically than horizontally. Bottom-hole temperature is normal for this depth, averaging about 132° F. Although no systematic bottom-hole pressure surveys have been made, early tests indicate them to vary somewhat in proportion to the amount of sand penetration taken. Average for the Kemp City (central) portion of the field, which has been under production for six years, is about 1,450 pounds, while the Kadane extension, about 3 miles to the west, tested over 1,800 pounds.

Gas-oil ratios are relatively small, varying from an average of 1,000 feet to 1 bbl. of oil in the center of the field to about 1,800 to 1 in the Kadane extension where most true sand was drilled.

Deep Oil Development Co. has already begun a pressure maintenance project on its Munger (discovery) lease in the center of the field. Following the recent completion of its high-pressure natural gasoline plant, all available residue gas from the 1,000,-000 feet daily deliveries to the plant is being returned to the sands in its No. 2 Munger, recently converted into an injection well. Experimental work is still in progress on this project. The fact that fluid conductance is more effective vertically than horizontally (indicated by early permeability measurements) makes a pressure maintenance project such as this one appear to have more than ordinary possibilities in sustaining production and increasing recovery.

Negotiations are now under way by several groups to take natural gas contracts in the field, preparatory to building other natural gasoline plants. K.M.A. casinghead gas is very rich, testing 2.19 g.p.m. of 26-70 gasoline, measured on the basis of 16 pounds separator pressure.

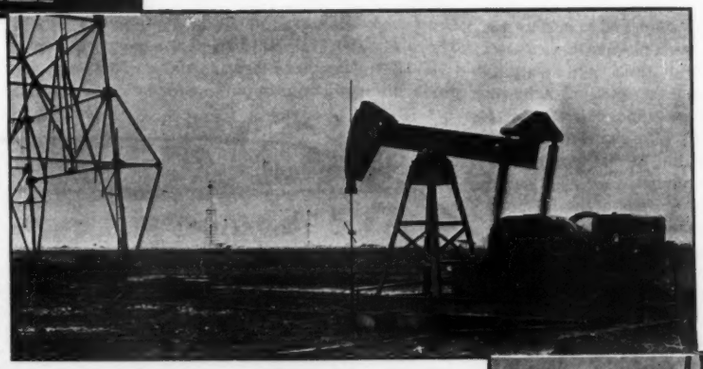
Producing conditions during the later life of the field will present no special problems. The reservoir apparently is almost completely under a gas or capillary control. Later drilling on the flanks may establish an active water drive, but from present known information a water level in any of the saturated portions of the K.C. lime has not been established. The high gravity of the clean crude, with an absence of paraffin, indicates an easy pumping life. The producing depth is suitable for back-side crank pumping, or heavy-duty central powers. Individual light-duty portable pumping rigs will probably be extensively used, especially if the 20-acre spacing pattern is followed in order to obtain maximum allowables under the present allocation formula.

Any estimation of established reserves in this field must, of necessity, be tentative and subject to many later revisions, due to the meager knowledge of the pay sections, and the early stage of development. Because of the limited core analyses data, and doubt as to the continuity of any of the six pay levels within the K.C. lime, volumetric calculations can only be rough approximations. For purposes of early estimates, either a consideration of yields made from the discovery well and others drilled five or six years ago, or a comparison with other Strawn-Bend producing areas, must be made.

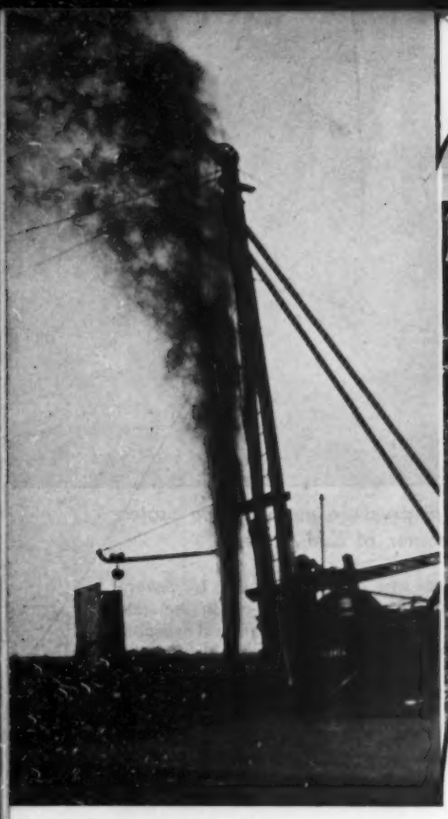
Accumulated productions from formations of similar age in the Ranger-Breckenridge districts (much of which was made without proration) varies from 8,000 to 12,000 bbls. per acre. Using yield to date from early wells, Deep Oil Development Co. No. 1 Munger, drilled in 1931, with an initial production of 125 bbls. daily, produced over

(Continued on Page 58)

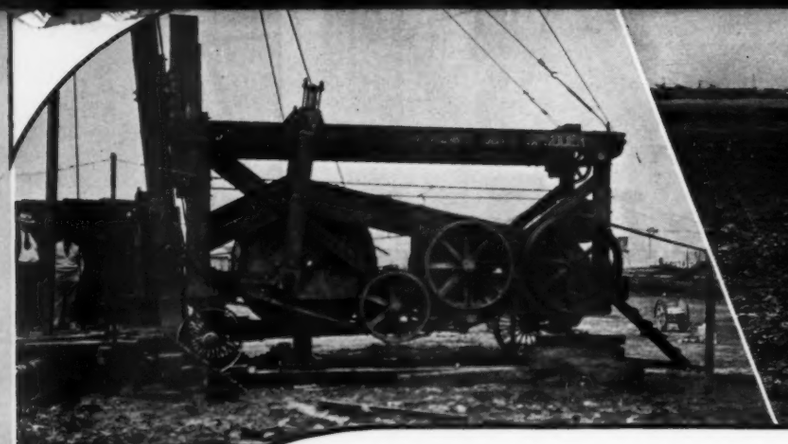
First portable pumping unit at K.M.A.



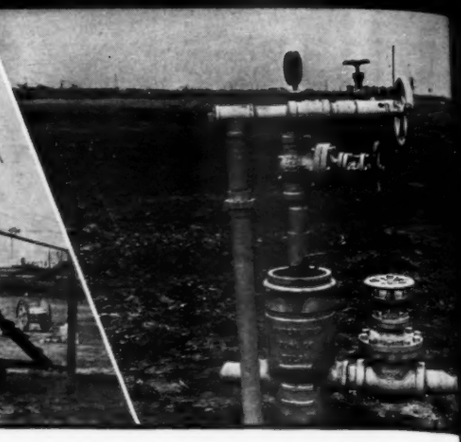
Derrick floor of a gas-powered portable drilling rig in K.M.A. field



No. 8 Munger flowing



Cable tool spudder



K.M.A. hook-up

DRILLING as Employed in

The K.M.A. field will be one of the most active, if not the most active, drilling fields in 1938. This statement is justified because an area exceeding 50,000 acres has been added to the proved field within the past six months; semiwildcat tests on all sides of production have been completed so rapidly that inside drilling has fallen far behind, and at the present time it is estimated there are from 3,000 to 4,000 proven locations which will eventually be drilled to the deep level.

The rapidity with which they are to be drilled is indicated by the fact that there are 81 separate individuals or companies owning leases within the established productive area, with no one company holding any control in any particular section. The steady entrance of outside leaseholders, through purchase at high prices, further indicates rather rapid development of inside properties over the next 12 months. Furthermore, at this time it cannot be said the field is definitely defined in any direction, so wildcatting along the outskirts of the producing limits, and extending all along the Electra-Bend Arch territory may be expected throughout the year.

Drilling to the 3,600-4,000-foot level at K.M.A. offers no actual drilling problems peculiar to that particular field, although much remains to be learned through experience in possible shortcuts, reductions in drilling time and drilling costs, and more efficient well completion. A great deal of the early drilling was done with old-style open drawworks rotaries which were formerly used for more shallow drilling in the North Texas district, but there is now a decided trend toward the thoroughly modern portable and unitized outfits as the field continues to grow and faces an intensive drilling campaign. Derricks used range from 96, 122 and 129 feet in height. The shorter drilling derricks have been considered more economical by some because of the savings in initial cost and moving expense, in view of the fact that only about 20 round trips are required for the drilling of the rotary hole to the top of the Kemp City lime, where they are standardized. With the appearance of larger and heavier rigs in the field, however, the 122- and 129-foot derricks are increasing in number due to their advantages in ease and safety of operation.

Very few steel substructures have been used. Most derricks are set upon 16- by 16-inch or 14- by 14-inch timbers, many of which are erected without digging cellar. On most installations the slush pump is located on the ground and operated through V-belt transmission from the drilling motors on the derrick floors. The use of substructures will probably increase if heavier duty rigs are moved in which employ individual prime movers for the mud circulating system.

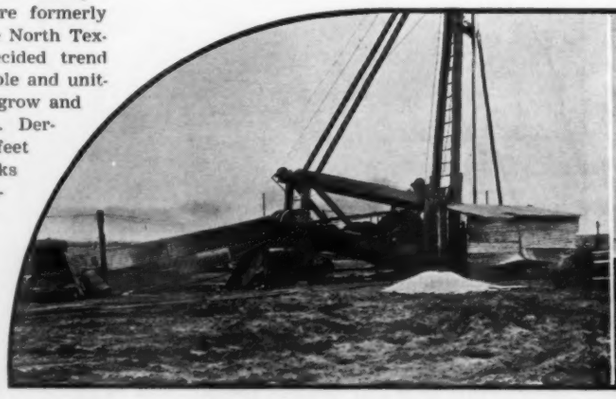
After erection of derrick, lines are strung and a 12½-inch surface hole spudded to about 100 feet. Ten-inch surface casing is set and cemented to the top. Rigging up of rotary tools is completed while waiting for cement to set. In certain instances where rotary tools are tied up but soon to be released at another location, the surface hole is dug with a spudder and surface casing set a few days before rotary tools are moved on. A 9-inch hole is cut with rotary to the top of the Kemp City lime, occurring at about 3,650 feet.

The diesel or gas-gasoline engine driven heavy-duty portable and unitized rigs have proved to be most adaptable to K.M.A. drilling. Drawwork sizes range from 5½-inch to 7-inch. There is a definite trend from the early rigs with two 125-hp. engines toward larger drilling engines having a maximum power of 225- or 250-hp. each. The 7½- by 16-inch slush pumps are most common, and have been found adequate to handle the flushing volumes required. Only a few installations have a standby slush pump in the circulating system.

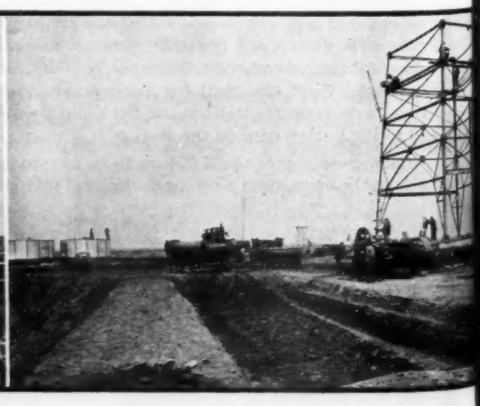
Steam driven rotaries are seriously handicapped in the K.M.A. development because of the lack of good boiler water. There is a great abundance of water in the territory, either from Wichita River, Beaver Creek, or the irrigation ditches. However, water from these sources is very high in alkali or "gyp" content, and have proved to be extremely harmful to the boilers, causing much shutdown time while drilling. Efforts have been made to soften the boiler water at individual wells with limited success. Water rights have been taken along Beaver Creek, and consideration is now being given to the construction of a central water treating plant, from which suitable water for drilling boilers can be sold at a nominal cost.

The few steam rigs have been fired with natural gas from the leases, or with crude oil. United Gas Pipe Line Co. is now extending its transmission lines into the field to supply drilling and operating requirements.

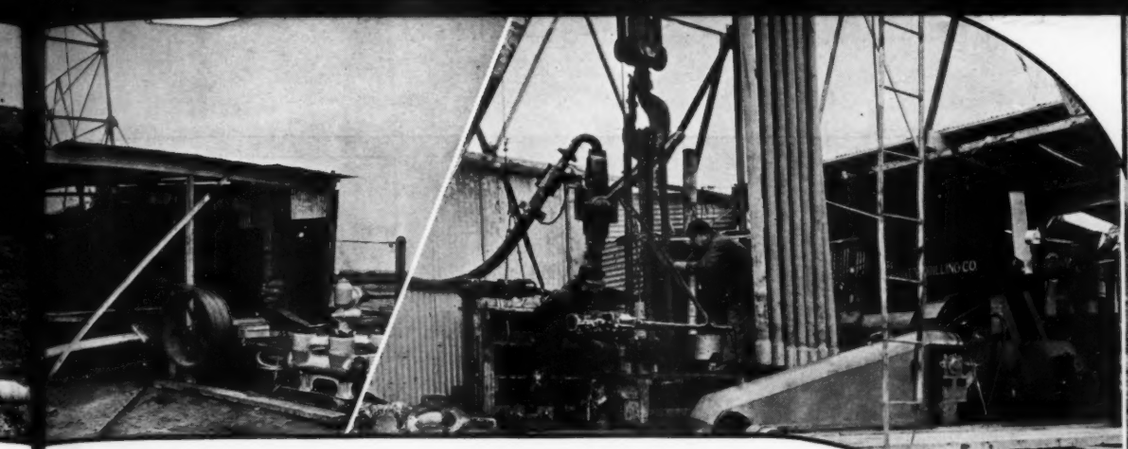
A 9-inch hole is cut below the surface pipe. It has been the practice thus far to use fishtail bits to the broken lime and shale sections occurring from 1,400 to 1,800 feet. An average of three or four fish or drag bits are required to



Portable spudder



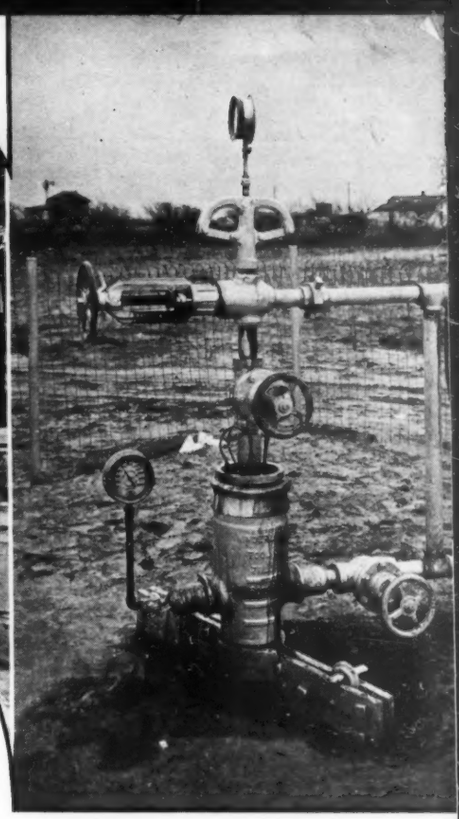
Building derrick and digging pits



Slush pump transmission

Returning drill pipe to hole

PRACTICE in the K.M.A. Field



Hook-up at No. 1 Mangold

this depth. The long-tooth, fast-cutting, rock bits have been found most suitable for drilling from this point through the section of sharp sands, broken limes and shales to the top of the lime encountered at about 3,650 feet. From 8 to 13 rock bits are required through this interval. Several sharp sandy sections are drilled below 1,500 feet, and it has been found helpful to increase flushing volumes of circulating fluid through these zones to minimize wear on the bit and pump liners. Experiments are now being made with the use of rock bits throughout the entire rotary hole.

Particular attention is paid to keeping a straight hole, in view of the fact that completion work is to be done with cable tools. Even a slight deviation from vertical can result in line or tool wear upon the casing.

The formations drilled permit a somewhat heavier weight to be placed upon the bit than average. About six points weight on the indicator is general practice, although of course the weight is varied by some drillers with table speeds through certain sections. This represents about 15,000 pounds (with six lines). Approximately 1,000 pounds per inch of bit diameter, or 9,000 pounds for the 9-inch bit, is considered minimum.

Table speeds are varied more than bit weights through beds of varying hardness, as experience has shown the footage per day or per bit can be increased by close studies of rotating speeds. The average of 125-150 revolutions per minute is employed in normal drilling. Further experience along this line will probably have a direct bearing upon reducing the drilling time in K.M.A. wells.

Although drilling fluids do not present any special problem, they do require close watch while drilling, if best results are to be obtained. From 9½- to 10-pound mud is usually maintained, which necessitates the addition of about one sack of commercial mud to the native clays every eight hours of drilling time. Because of the reasonably good wall strength in normal holes, and the presence of many sharp sands, some operators prefer to use a considerably lighter drilling fluid while making hole, and then circulate thoroughly with heavy commercial mud before attempting to run casing. Those who use the heavy mud through the entire hole accomplish an effective removal of the abrasive sand cuttings by digging their pits to a depth of 4 feet or more, and allowing more time for settling.

After topping the Kemp City lime, about 10 feet of penetration is taken before setting the 7-inch production string and cementing it with from 200 to 300 sacks. The normal bottom-hole temperature of about 130° F. does not present any particular cementing difficulties.

The slush pump and other machinery that can be released is torn down and moved to new location while waiting the required 48 hours for cement to set, after which casing is cut and well head connections installed. The derrick and remainder of rotary rig is immediately moved and portable cable tool spudder is set over the hole for drilling of the pay section, and well completion.

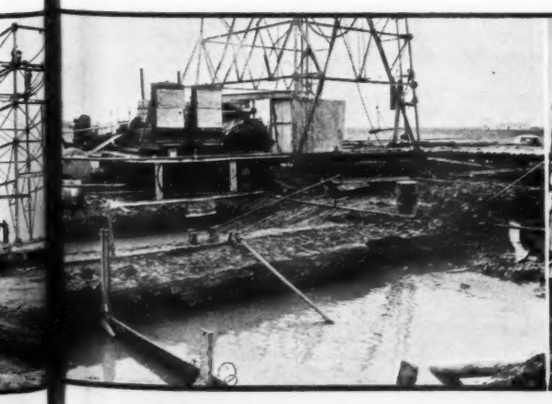
There are six separate saturated sections found throughout the 200-250 feet of Kemp City lime, ranging in character from tight oolitic limestones to very porous sections of almost pure sand. A 6¼-inch hole is cut to the desired depth in this section. There has been no uniform point at which wells are bottomed in the field, although experience has taught not to drill far into the lower pay level as salt water occurs in some parts in this zone. The growing practice is to drill only into the upper and uniform section of saturated limey sand, permitting the well to flow into the pits until it is difficult to keep tools on bottom. In most cases the wells are permitted to flow over the mast head while pulling out the cable tools.

To discourage taking too much penetration when completing these wells, the Texas Railroad Commission stipulated in its recent order that only a maximum of 500 bbls. per day would be granted any well as its potential factor in calculating allowables upon a 50 per cent acreage and potential basis.

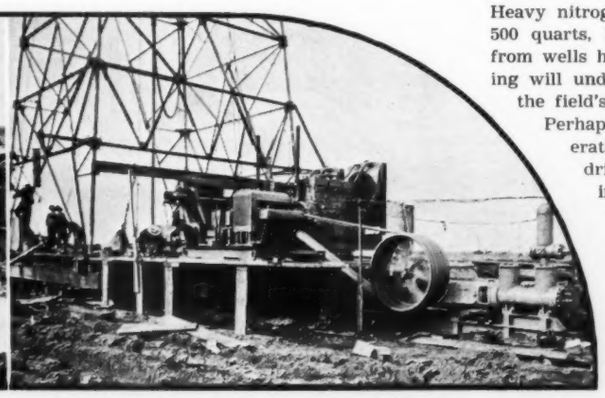
Selective applications of acid in the saturated oolitic lime sections have proved to be beneficial. Heavy nitroglycerin shooting, with shots up to 500 quarts, have greatly increased initial flow from wells having large sand saturations. Shooting will undoubtedly be an important factor in the field's future manner of well completing.

Perhaps the greatest opportunity open to operators in the K.M.A. field for reduced drilling time and cutting costs lies in improved completion methods. No wells have been selectively completed in the Kemp City limestone, but initial experiments are now being considered. For the first time, a well is now being cored continuously through the entire section. Findings in this and other wells similarly cored will assist greatly in improving completion technique. Rotary

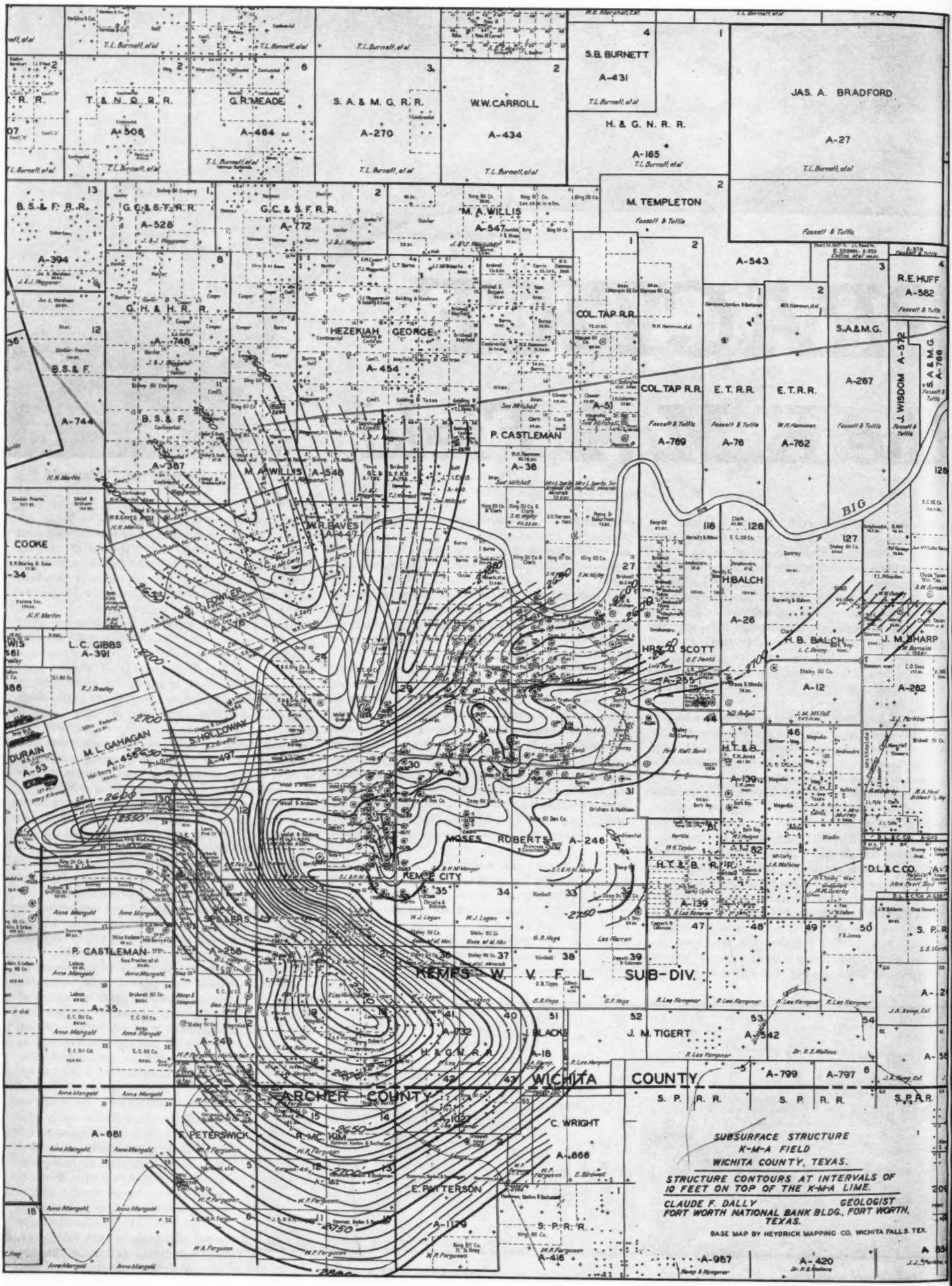
(Continued on Page 56)



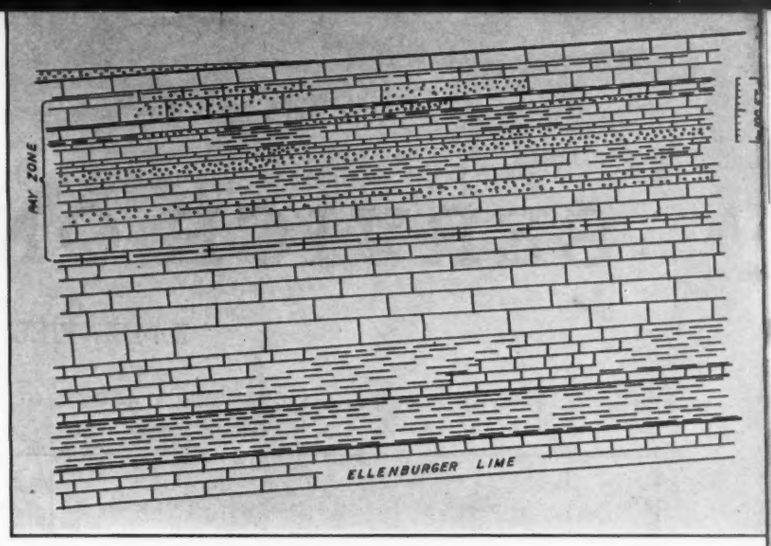
Diesel-powered rotary



Diesel rig in K.M.A. field


SUBSURFACE STRUCTURE
K-M-A FIELD
WICHITA COUNTY, TEXAS.
STRUCTURE CONTOURS AT INTERVALS OF 10 FEET ON TOP OF THE K-M-A LIME.
CLAUDE F. DALLY GEOLOGIST
FORT WORTH NATIONAL BANK BLDG., FORT WORTH, TEXAS.
BASE MAP BY HEYDRICK MAPPING CO. WICHITA FALLS, TEX.
WICHITA COUNTY
ARCHER COUNTY
KEMP'S W. V. F. L. SUB-DIV.
REMCO CITY
S. A. & M. G. R. R.
T. & N. O. R. R.
H. & G. N. R. R.
G. C. & S. F. R. R.
B. S. & F. R. R.
COL. TAP R.R.
E. T. R. R.
S. P. R. R.
BIG

GEOLOGY of the K.M.A. Field



Typical section of K.M.A. producing horizon

By CLAUDE F. DALLY
Consulting Geologist, Fort Worth, Tex.

The existence of a deep pay in the K.M.A. field has been a matter of common knowledge for a number of years but no great importance was attributed to it until a large well was discovered in it during the early part of 1937. Since that time, activity has gone ahead at a fairly fast rate and so much interest has been shown it has developed into one of the oil country's "hot spots."

Prior to the development of this area, the deep structure has been a matter of more or less conjecture due to the lack of sufficient wells having been drilled to this horizon to afford satisfactory subsurface control. The subsurface structure of the upper pay zones was fairly easy to work because of the large number of wells which had been drilled to these pays. It is now apparent that only a very slight regional structural resemblance is evidenced between the deep and the shallow pays. In many particulars, in fact, the deep and the shallow pays are directly divergent. Due to the lack of relationship between these pays, and also because of the timely interest of the deeper pay, this article deals solely with the deeper pay zone.

Structural Relationships

The K.M.A. field occupies a position at the southern extremity of the Electra arch which, in turn, is a spur of the Red River uplift, further north. The Red River uplift is a major structural feature roughly paralleling the Red River (from which it takes its name) and extending through Foard, Wilbarger, Wichita, Clay and Montague counties. Many of the fields of North Texas are located on this uplift.

The axis of the Red River uplift is, of course, roughly east-west and the axis of the Electra arch curves off of this regional feature, trending into the extension of the axis of the Bend arch which plunges northward through Eastland, Stephens, Young and Archer counties.

The K.M.A. field is a local feature between these two major features and it may be seen from the accompanying structure map that the main axis of the K.M.A. field has a northeast-southwest trend but minor deviations from this general axis are apparent in the present developed area and others will doubtless appear as further drilling and development bring out the detailed structural features. The writer's interpretation of these minor deviations, or wanderings, from the main axis of the field, and, for that matter, the direction of the axis of the field proper, is that they are attempted structural adjustments to the axial trends of the major structural features to the north and south of the field—the Red River uplift and the Bend arch, —and probably caused by a sort of "squeezing" action between these two features at the time they were uplifted. The K.M.A. field therefore occupies at least a portion of the saddle between the Electra arch and the Bend arch.

In its present stage of development, the structure of the deep pay zone is subject to minor variations in its interpretation. Faulting, according to some geologists, is present in the field. The writer has no concrete evidence that faults are actually present although later developments may prove their presence.

Age of Pay Zone

The age of the K.M.A. lime has been the subject of a great deal of discussion among geologists. Some maintain it is very definitely Strawn while others are just as certain it belongs to the Bend. Paleontologists are also divided in their opinions as to its classification. Needless to say, each adherent backs up his argument by either lithologic or paleontologic evidence—or both.

Correlations carried downward from the upper formations tend to show it is Strawn in age since there is no definite lithologic break to prove it otherwise. However, the same logic holds true if correlations are made from the deeper formations upward—and it then appears to be Bend in age. Black shales appear in the section but when these are dried out they are blue rather than a true black.

The section, as developed thus far, is not typical of the Strawn as we know it on the Bend arch but the conditions are dissimilar under which they were laid down. Limes sometimes appear above, below and within the Strawn sands but usually with more or less regularity in the section. Rarely do sandy zones occur within Strawn limes and although the Strawn sands are lenticular over broad areas they are seldom lenticular locally. The Strawn sand zones are usually identifiable within the formation itself and can be carried for long distances. Neither can it be said the K.M.A. lime is typically Bend because there are easily identifiable sand or sandy zones within the Marble Falls lime and they are very persistent over broad areas. Apparently, neither of these conditions is met in the K.M.A. field.

Notwithstanding arguments as to age, the really important thing to the industry is that this lime produces oil in commercial quantities and a good name for it is the K.M.A. lime.

Character of Pay

Physical characteristics of the pay zone vary considerably from place to place within the field. Two or three late wells are reported to have encountered sand above, or in place of, the regular lime. Most of the wells which have sand encounter it at various depths within the lime—indicating the sand is very lenticular and occurs with little or no regularity. The sand is very fine, powdery and compact indicating a long producing life. Some wells in the field have encountered no sand but get their pay in lime. The pay varies from sand to limey sand to sandy lime to lime. Some of the sand grains are coated with a thin veneer of lime—oolitic in character.

The pay zone, in the light of present information, is about 300 feet in thickness. Apparently this thickness is fairly constant throughout the field since several widely separated wells have logged approximately the same section of lime in this horizon. However, further detailed knowledge of this must await future development within the field.

Each new location is a semiwildcat with respect to the sand zone within the lime, there being, at present, no definite method of forecasting just where in the pay zone the sand will occur—if it occurs at all.

Deeper Prospects

There is apparently no hope of obtaining production in the deeper horizons. This is based on the fact that two wells, Gulf Production Co. No. 43-A Burnett and Deep Oil Development Co. No. 1 Munger, both have been drilled into the Ellenburger lime without encountering production. Both of these wells are excellently located on structure and unless there is an extremely wide divergence between the K.M.A. lime and the Ellenburger lime they have both been good tests of the Ellenburger.

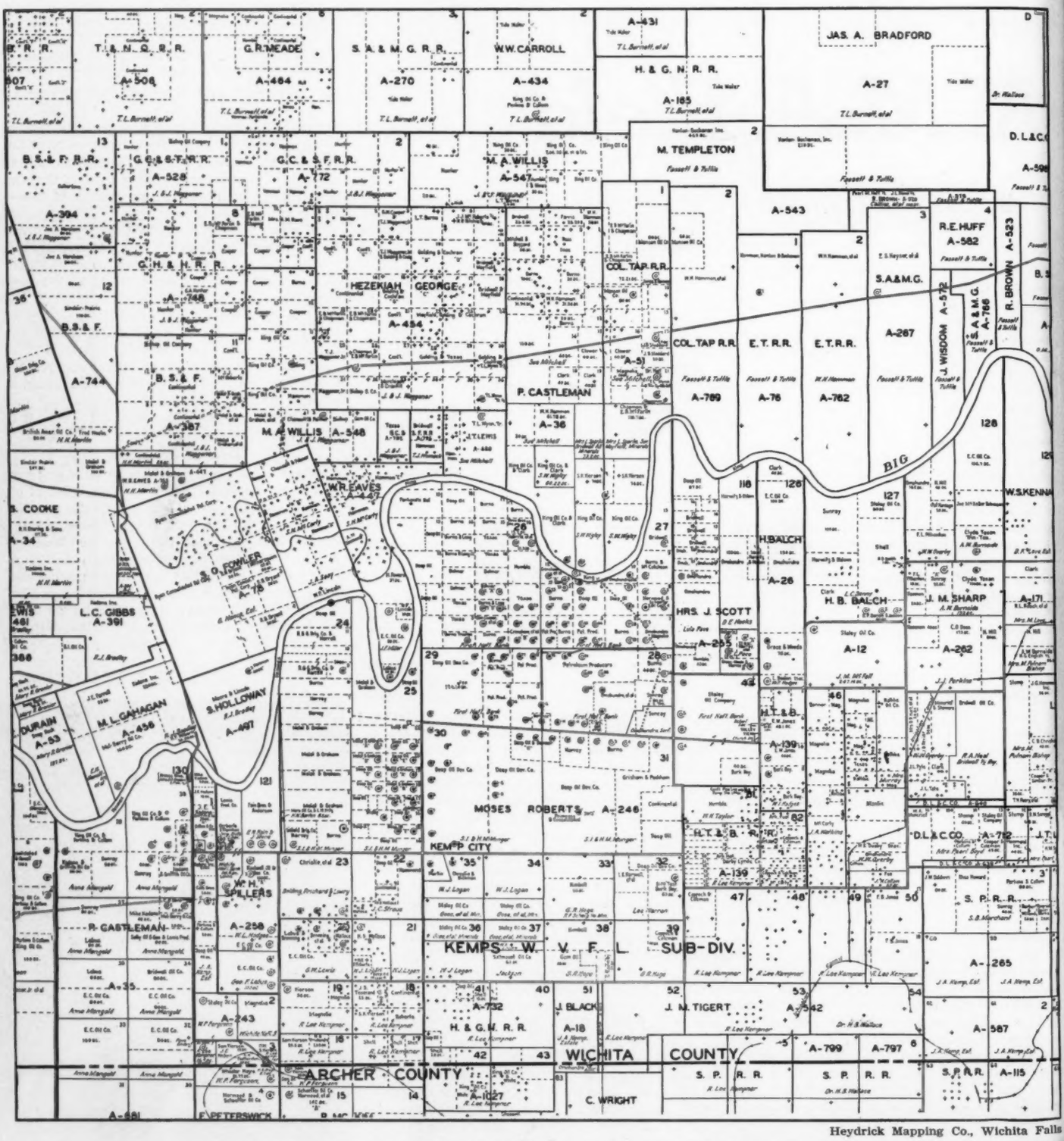
(Continued on Page 56)

CLAUDE F. DALLY

SERVICE ON NEW FIELDS

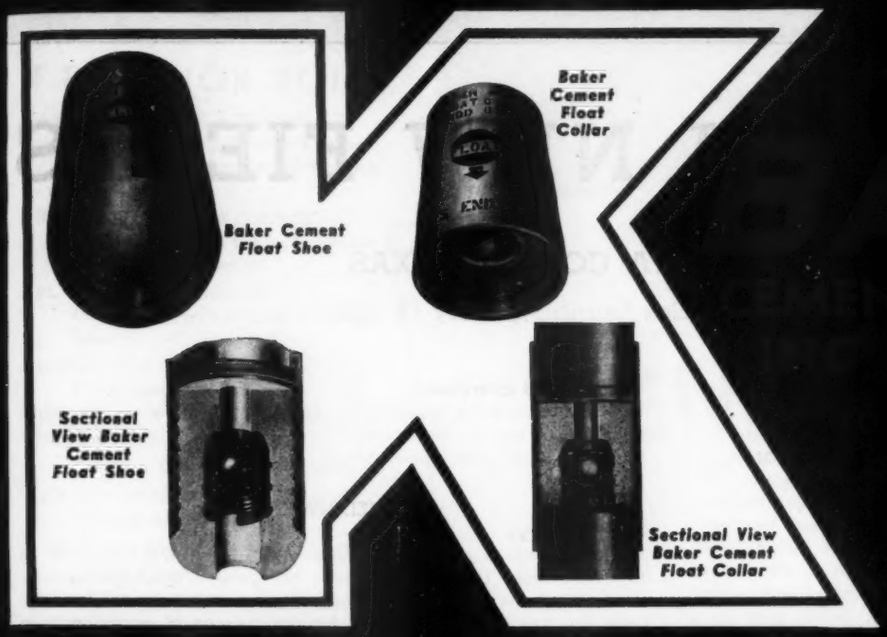
K.M.A. FIELD, NORTH TEXAS

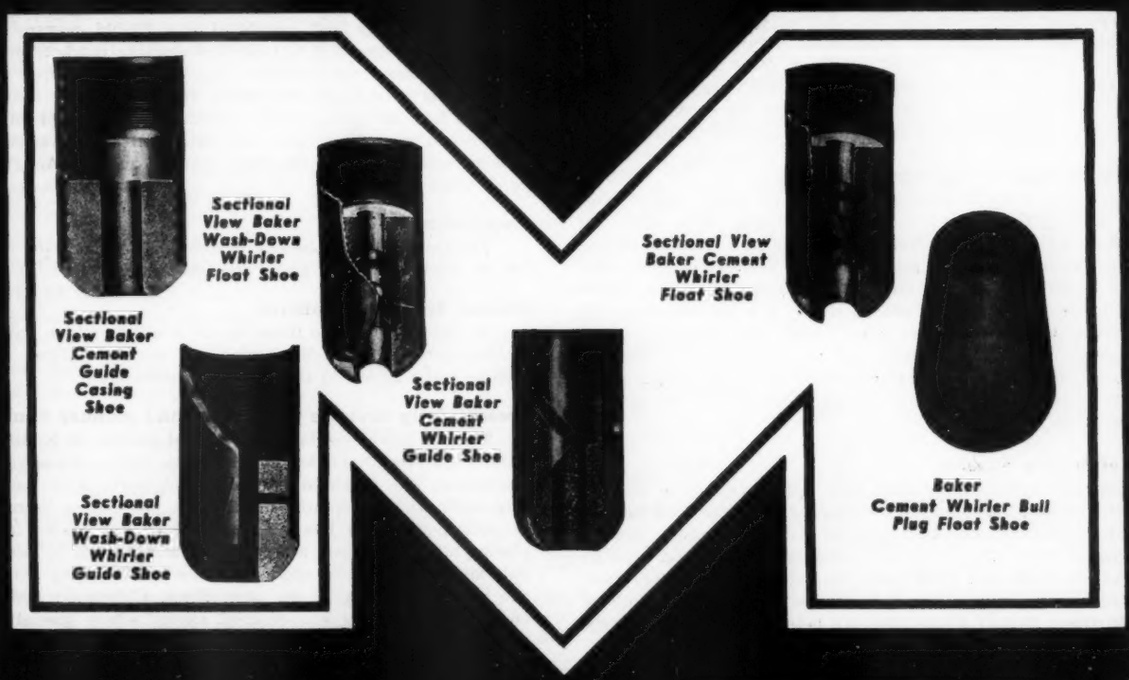
Compiled by The Oil and Gas Journal, January 15, 1938



Heydrick Mapping Co., Wichita Falls

Circled wells are deep present locations or producers in the Kemp City lime


Baker Cement Float Shoe
Baker Cement Float Collar
Sectional View Baker Cement Float Shoe
Sectional View Baker Cement Float Collar


Sectional View Baker Wash-Down Whirler Float Shoe
Sectional View Baker Cement Guide Casing Shoe
Sectional View Baker Wash-Down Whirler Guide Shoe
Sectional View Baker Cement Whirler Guide Shoe
Sectional View Baker Cement Whirler Float Shoe
Baker Cement Whirler Bull Plug Float Shoe

BAKER salesmen are thoroughly conversant with conditions in the K.M.A. field and will be glad to assist in the selection of the proper type of Baker Shoe and/or Collar best suited for your particular well.

Complete stocks of Baker Cement Guiding, Floating, Cementing Equipment are carried by your local supply dealer.

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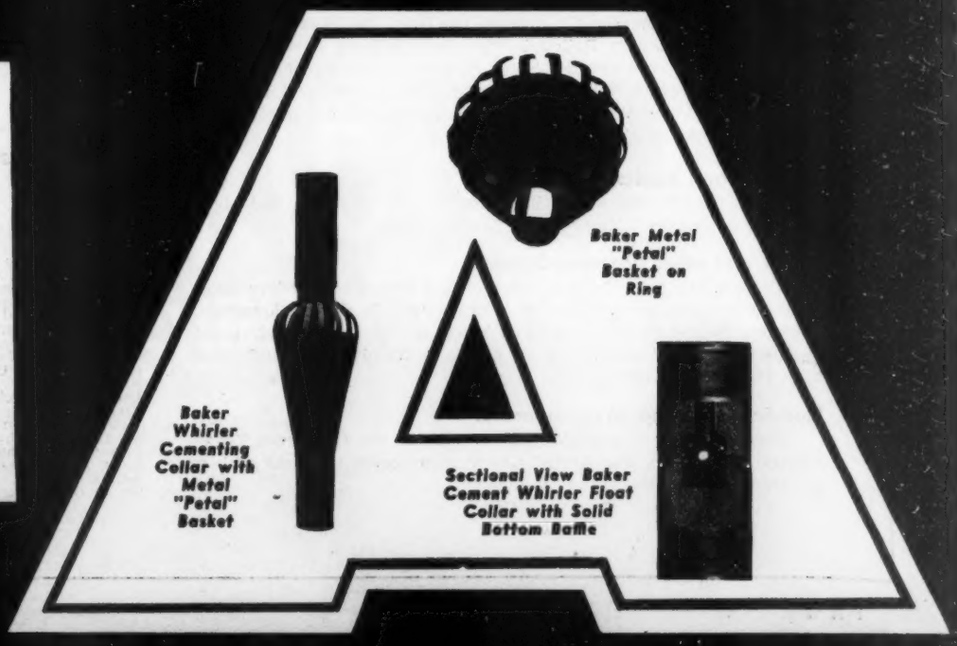
GUIDING, FLOATING AND CEMENTING


Baker Metal "Petal" Basket on Ring
Baker Whirler Cementing Collar with Metal "Petal" Basket
Sectional View Baker Cement Whirler Float Collar with Solid Bottom Baffle

SERVICE ON NEW FIELDS

K.M.A. FIELD, WICHITA COUNTY, TEXAS

Compiled by The Oil and Gas Journal, January 15, 1938

Approved name:

Several names have been given the new deep lime and sand production of North Texas, but the name now almost universally accepted is—the K.M.A. field. The initials represent Kemp-Munger-Allen, and the shallow sand field was so named because almost all of the producing area was originally on lands owned by the late J. A. Kemp, S. H. Munger, and Reece Allen, in what was formerly called the Beaver Creek district. The name K.M.A. was carried over from the shallow field to the present deeper one. It is sometimes written K-M-A, or KMA, but the accepted proper way of expressing the field is K.M.A.

Geographic location:

The K.M.A. field is situated along the south line of Wichita County, extending down into northern Archer County, Texas. It is 15 miles southeast of Electra on paved state highway, and 14 miles southwest of Iowa Park on gravel highway. It is accessible from Wichita Falls, 20 miles to the east, by good highways, partly paved and partly all-weather gravel. Plans have about been completed to construct a paved highway from Wichita Falls directly into the field.

Principal cities and towns near the field:

Wichita Falls, Tex., is the headquarters for practically all the operators, drilling contractors, supply houses, etc. This city, the county seat of Wichita County, Texas, is located on the banks of the Big Wichita River, about 12 miles from the Texas-Oklahoma state line. It has an altitude of 1,000 feet. Its population of 56,500 people are served by 18 public schools, one of which is a junior college, 64 churches, three daily newspapers, three banks, four railroads, three hospitals, eight bus lines, air mail and passenger service, and 12 modern hotels. There are eight large modern office buildings, ranging from 6 to 13 stories, together with a large number of smaller office accommodations.

Location of supply houses:

Six supply companies have maintained supply stores at Electra to serve the old fields, and they are enlarging their facilities to supply the K.M.A. development. There are 23 supply or service companies in Wichita Falls. Two have been established at Kemp City in the heart of the field, and there are ample sites available for other supply branches. One supply store is located at Iowa Park, and others are planned there. Supply house sites are being taken at Kemp City in the heart of the field. Two stores are already at Kemp City.

Railroads serving the area:

No railroads run directly through the field. The Fort Worth and Denver and Burlington Railroads run through Iowa Park 14 miles southwest, and also through Electra 15 miles southeast of the field. The city of Wichita Falls is served by these roads, and also the M-K-T Railroad, and Wichita Falls and Southern which connects with the Rock Island in Waurika, Okla.

Trucking and hauling facilities:

Teams and trucks are available for hire in the field, and eight trucking companies operate out of Wichita Falls.

Hotels and other accommodations:

There is one brick hotel in Iowa Park. Limited but modern hotel facilities are available at Electra. Wichita Falls is the headquarters, however. Here 3 of the 12 modern hotels are air-conditioned. Good modern houses and apartments are scarce in Wichita Falls, and rents have risen to premium prices.

Electric power and gas companies:

Electric power is available on the edge of the field from Texas Electric Service Co. The United Gas System serves the field with a gas transmission line.

Schools and churches:

In Wichita Falls proper there are 64 churches of 17 denominations. There are 13 elementary schools, 2 junior highs, one senior high school and one junior college.

DEVELOPMENT

Early history:

K.M.A. was a shallow pool since 1920, producing from 450- to 1,800-foot sands. Unlike most booms, the present deep-sand activity simmered in the making for almost six years. The Deep Oil Development Co. was organized in 1930 for the purpose of exploring deep horizons in North Texas. Early in the year it drilled its No. 1 Munger as a deep test of the K.M.A. shallow structure. After drilling to a total depth of 5,430 feet, the test hole was plugged back for a test of upper showings, and completed as a 125-bbl. pumper in the deep pay section of the K.M.A. field. Unfavorable market conditions, and the East Texas field discovery, discouraged any rapid development of the new producing level. Only five wells were completed until 1935. In late 1937 four wildcat locations were staked on all sides of the proven area. They were all completed as impressive producers and more than doubled the field's proven acreage. Activity has been rapid since that time.

Completions to date:

Total oil well completions to date now number 103 of which 102 are in Wichita County and 1 in Archer County.

Present drilling operations:

At the present time there are 20 locations which have taken out drilling permits; 42 wells rigging up; and 54 drilling. Of the total drilling wells 20 are in the process of completion.

Present daily average production; and manner of allocation:

The 103 producers in the deep-sand portion of K.M.A. now have a daily allowed production of 6,100 bbls. Up to January 4, 1937, this production was allocated under the old North Texas order, permitting wells with a potential of 500 bbls. per day or more to produce 58 bbls. per day. A new allocation order was issued on that date, placing allowables upon a 50 per cent acreage and 50 per cent potential basis, with the acreage allowable units having a maximum of one well to 20 acres. In the same order, a minimum spacing rule of one well to 10 acres was ordered, except where special permits are granted.

Accumulated production:

From 1931 (year of discovery) to the end of 1936, a total of 13 oil wells had been completed, from which an accumulated production of 351,578 bbls. had been recovered. At the end of 1937 a total of 86 oil wells had been completed. Total 1937 production equaled 671,511 bbls. (November and December estimated), bringing total accumulated for the field to about 1,023,089 bbls.

PRESENT OWNERS OF PRODUCING LEASES

Operator—	Number producing wells
The Bohner Co.	2
Burk Royalty Co.	1
L. T. Burns	9
Christie-Hickman Drilling Co.	2
Consolidated Oil Co.	1
G. W. Cooper and associates	1
Deep Oil Development Co.	34
Grace and Wood	2
Haberel & Thornton	1
Hammon, Hanlon, Buchanan, Inc., and Hanaghan & Hanlon, Inc.	1
Hammond Oil Co.	1
Kadane-Griffith Oil Co.	1
King Oil Co.	2
Lebus and associates	1
Jack H. Martin	1
Melat & Graham	6
W. B. Omohundro	3
Petroleum Producers Co.	12
Reed, Glass & Crenshaw	3
Schaffer Oil Co.	1
Staley Oil Co.	2

F-R HONOR ROLL

AXELSON MANUFACTURING CO.
Steel and Reading Genuine Puddled Wrought Iron Sucker Rods—Working Barrels.

BEAUMONT IRON WORKS CO.
Crown and Traveling Blocks, Drawworks and Pumping Equipment.

BLAW-KNOX COMPANY
Gas Cleaners—Steel Grating—Tracy-fiers.

DONOVAN BOILER WORKS.
Oil Country Boilers

FOOTE BROS. GEAR & MACHINE CORP.
Reduction Gears for Pumping Units

JENSEN BROS. MFG. COMPANY
Pumping Jacks.

JONES & LAUGHLIN STEEL CORP.
Tubular Goods.

LINEAR PACKING & RUBBER CO., INC.
Packing for All Needs.

MIDWEST PIPING & SUPPLY CO., INC.
Welding Fittings.

NATIONAL TRANSIT PUMP & MACHINE CO.
Steam and Power Pumps—Rotary Pumps—Compressors.

J. P. RATIGAN
"Sure-Grip" line of Pumping Equipment including Grips, Clamps, Beam Hangers, Rod Elevators, Etc.

RAYBESTOS-MANHATTAN, INC.
Raybestos Rotary Brake Lining.

READING IRON COMPANY
Reading Genuine Puddled Wrought Iron Tubular Goods.

JOSEPH REID GAS ENGINE CO.
Gas and Diesel Engines—Pumping Powers.

REPUBLIC RUBBER COMPANY
Transmission and Conveyor Belting—Mechanical Rubber Goods.

REVERE COPPER & BRASS, INC.
Revere Condenser Tubes.

JOHN A. ROEBLING'S SONS CO.
Wire Lines—Gas and Electric Welding Rods.

WALWORTH COMPANY
Valves—Fittings—Tools—Lubricated Plug Valves.

WHELAND COMPANY
Slush Pumps—Swivels—Rotary Tables—Steam Engines.

WHITLOCK CORDAGE COMPANY
Manila Drilling Cable—Bull Ropes—Cat Lines—Waterflex Cordage.

The first Frick-Reid Store, Bartlesville, Oklahoma, still doing business at the old stand.

KMA REMINDS US

At one time the discovery of a field like KMA would have resulted in something more nearly like an old-time gold rush.

And in the mad excitement the transitory supply house, with no background of service, no reputation for quality and no precedent for continued, dependable service, would have come in for profitable patronage.

Today that picture is largely changed. In KMA, as in other flush production areas, the oil industry has learned to guard its own interests and provide for smooth, economical operation after the flush period. More of its patronage is confined to those supply houses which enjoy a reputation for prorating profits over the lean years when drilling is ended and there is vital but limited need for replacements and repair parts service at local stores.

We invite thoughtful consideration of the important advantages of doing business with Frick-Reid branches, with their unparalleled background of service and their well earned and firmly established reputation for handling Quality Products only. We also invite thoughtful consideration of the significant fact that the first Frick-Reid Store is still doing business at the old stand.

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Equipment Suppliers Exclusively—Stores in Old and New Fields

FUTURE DEVELOPMENT

Proven area:

Important extension wells have been completed so rapidly during the past 60 days that the proven area changes almost weekly. From present control used in contouring the producing section on top of the Kemp City lime, a total of about 78 square miles, or about 50,000 acres, are within the confines of the proven area. Furthermore, the field's limits have not been definitely established in any direction.

Undrilled locations in proven area:

Assuming an average spacing pattern of one well to 10 acres, and deducting the present completions, there now remain 4,900 proven but undrilled deep locations at K.M.A. With the 50 per cent acreage factor now injected into the allocation of production here, allowing 20-acre maximum tracts, many parts of the field will not be drilled to a 10-acre density.

Estimated rate of drilling during next 12 months:

The reason so much acreage has been proven in such a short time is that all the inside leases have been held for years by the shallow stripper production, largely by the major operators, and they have been in no hurry to explore the deep producing level. Owners of attractive but unproven acreage along the fringe of the shallow field were the ones anxious to prove their holdings. As a result, about three-fourths of the deep producers at K.M.A. at the present time were important field extensioners at the time of their completion.

Present indications are that the holders of inside and proven acreage will begin a methodical development of their properties early this year, and completions at the rate of 100 or more per month during the entire year is not unlikely. Due to the wide diversity of lease ownerships (in the hands of about 75 different individuals or companies), development over the next year or two may be more rapid than estimated.

DRILLING

Type of drilling equipment used:

There is a rapid transition in K.M.A. deep drilling from the old-style rotaries that were moved down from the Burkburnett field and other nearby areas, to the most modern and up to date equipment suitable for 4,000-foot drilling. Portable and fully unitized rigs are widely used. Largest of the present rigs drilling in the field consist of two 225-hp. diesel or gas-gasoline motors, 6-inch alloy steel drum shaft. One slush pump is standard, usually being situated on the ground and V-belt driven from engines on derrick floor. Maximum size pumps are the 7½-inch by 16-inch stroke.

Fuel:

Gas, gasoline or diesel fuel is most commonly used for K.M.A. drilling rigs. Available water supplies nearby all contain an excessive amount of "gyp" which proves very harmful to rotary steam boilers. Largely for this reason, steam rigs are not popular in the field. Some of the few steam rigs are firing their boilers with crude oil.

Type drilling bits used:

Fish tail bits are used to the broken lime and shale sections occurring from 1,400 to 1,800 feet, and rock bits from this point to the Kemp City lime top. The pay section is drilled with cable tool spudder. Some contractors are now experimenting with using rock bits from surface down, and are reporting good results.

Casing program:

A 10-inch surface string is set at around 100 feet, and the 7-inch production string is set and cemented at around 3,700 feet, usually about 10 feet in the Kemp City lime.

Speed in drilling:

Rigging up time averages about three days. From 15 to 22 days are required to spud in, set surface pipe, wait 48 hours, and then drill to the Kemp City lime. Spudding and completing time varies from well to well, from a minimum of four days to a maximum of two weeks.

Drilling problems:

As in any new area, a great deal remains to be learned about drilling in the K.M.A. field in order to develop all the short-cuts and economies possible. However, there are no actual problems peculiar to the drilling of these wells that do not accompany any 4,000-foot hard rock digging.

Drilling fluid:

A 9½- to 10-pound mud is most commonly used; the fluid must be thin enough to permit settling of sharp and abrasive sand particles encountered throughout the entire depth, and at the same time give sufficient wall strength to the loose and "sluffing" beds. Rather rapid flushing rates are used in order to minimize the harmful effects of the sharp sands when drilled.

Method of completion:

The Kemp City lime ranges from 200 to 250 feet in thickness. Six separate pay sections are known to be present in this zone in certain parts of the field. The saturated portion varies from rather tight oolitic limes to relatively pure sands with high porosity. Due to the variations in occurrence of the pay, it has been considered desirable to standardize all wells upon top of the lime, and penetrate the section slowly with cable tool spudders. In all early wells, drilling was continued entirely through the lime, but most wells are now bottomed in the saturated sandy section occurring from about 3,825-75 feet. After taking sufficient penetration, wells are permitted to flow over the mast head while tools are being removed from the hole. Although allocation of K.M.A. wells is 50 per cent on potential, a maximum potential of 500 bbls. is stipulated in order to discourage deep penetrations into the pay section.

No selective well completing work has been done in the field yet. Experimental electrical surveys are being made, and some changes in the completing of wells may be anticipated.

PRODUCING PRACTICES

Methods of production:

Only nine of the total producers are on the pump. All but two of these were completed prior to 1935. The high-gravity oil; rare appearances of water; absence of paraffin and high fluid levels, indicate a relatively easy pumping field. The producing depth will permit the use of heavy-duty central powers, or back-side cranking devices. The present bottom-hole pressures indicate a well-sustained flowing life for the field. Initial steps are now being taken to repressure one portion of the field, and similar projects in other sections are planned when additional gasoline plants are constructed.

GENERAL PHYSICAL DATA

Bottom-hole pressures:

No systematic surveys of bottom-hole pressures have been made in the field. Recent tests in the Kemp City area of the field (which has been under production for six years following completion of discovery well) indicates a bottom-hole pressure of about 1,450 pounds. Four miles to the west, the Kadane extension well tested about 1,800 pounds on bottom-hole test.

Gas-oil ratios:

Approximately 1,000 feet of gas is produced to 1 bbl. of oil. Ratios seem to be increasing some as the field is extended westward.

Formation characteristics:

The oolitic lime section of the saturated pay shows a porosity of from 6 to 13 per cent on test. The sandy section constituting the main producing zone tests about 24 per cent pore space by volume. Percentages of saturation have not been measured except in one or two instances, but estimates of field geologists range from 60 to 80 per cent saturated. Initial permeability tests show easier vertical movement of fluid than horizontal; no test data on either vertical or horizontal permeability is available, however.

Crude oil analysis:

ANALYSIS OF K.M.A. CRUDE—WICHITA COUNTY

Sample made up of oils taken from two wells on opposite edges of pool; depth 3,750 feet and 4,018 feet.

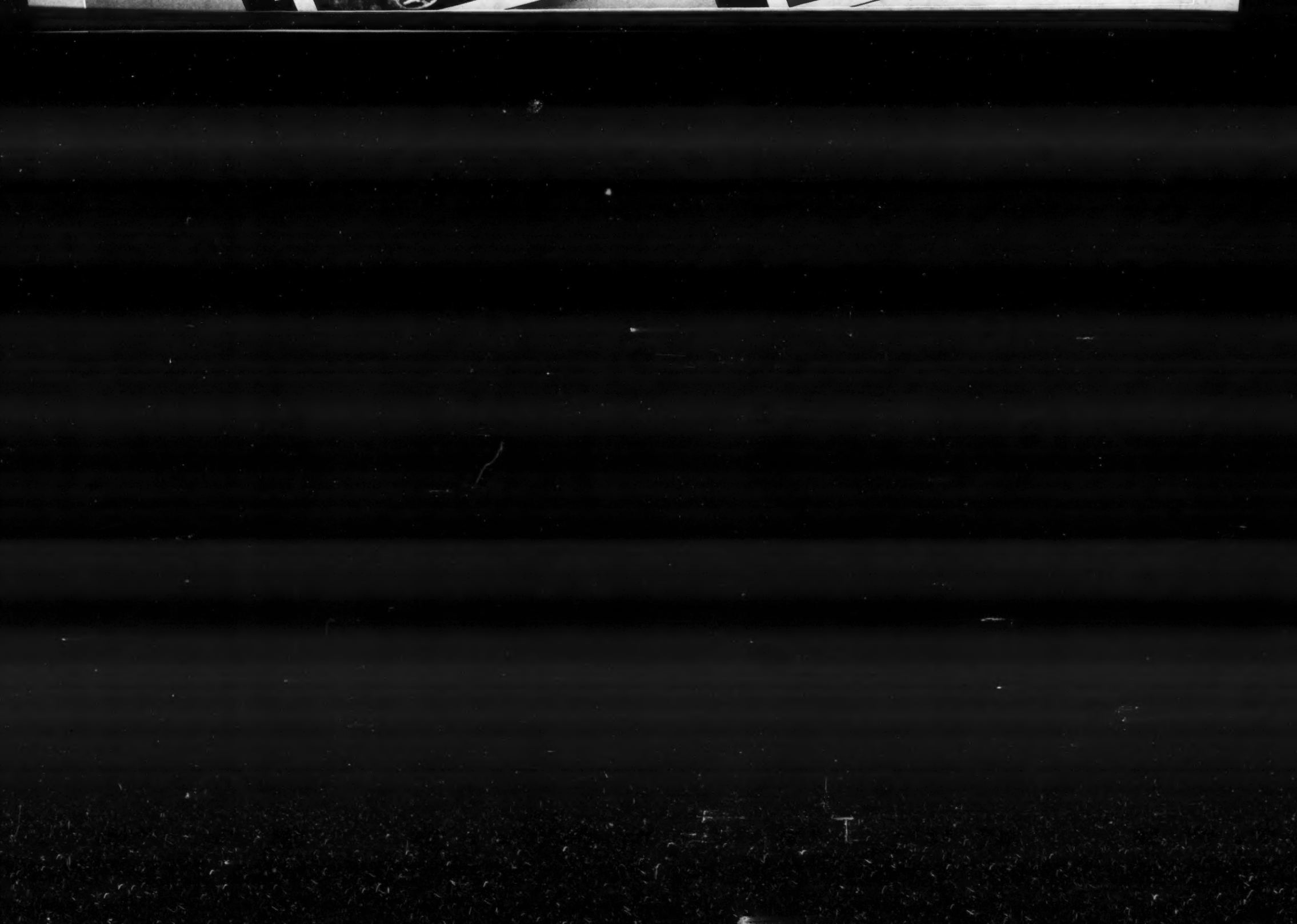
Laboratory tests on crude:	
Gravity, °A.P.I.	43.0
Viscosity at 100° F.	36
Pourpoint	Below 0 °F.
B.s.&w., per cent	0.5
Sulfur, per cent	0.24
Yield:	
Gasoline, per cent	45.0
Gravity	60.0
Endpoint, °F.	400
Octane number	52
Kerosene, per cent	1.0
Gravity	41.0
Cracking stock, per cent	37.5
Residuum, per cent	14.5

NATURAL GAS

Natural gasoline plants:

Deep Oil Development Co. has recently completed a 1,500,000-foot capacity compression-absorption gasoline plant on its Munger (discovery) lease. It is handling about 1,000,000 feet daily from its own

(Continued on Page 56)



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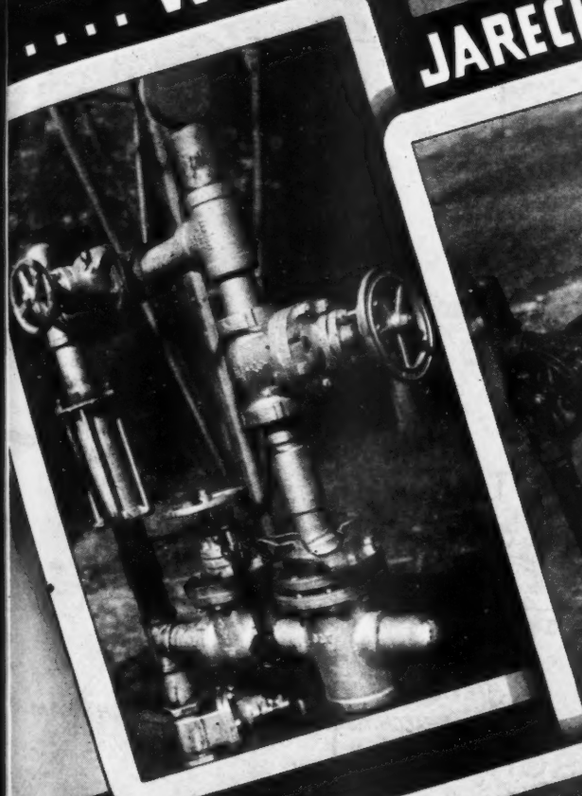

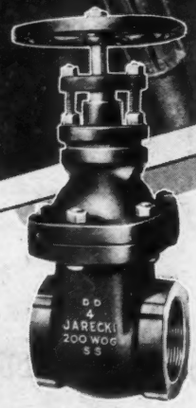

Fig. 57-H JARECKI
Heavy Oil Malleable Elbow

Fig. 395-X JARECKI Heavy
Standard Gate Valve, 350 Lbs. Test

● We make no extravagant claims for JARECKI Valves and Fittings. But we do believe these "Timed-Tested" Products will prove 100% efficient in your operations . . . will deliver maximum service . . . will actually reduce your maintenance expense. On thousands of installations throughout the oil country, JARECKI Valves and Fittings are giving lower-cost performance.

The JARECKI line of Valves and Fittings is complete. We manufacture all types of gray iron, malleable iron and bronze valves, including globe, angle, check, safety, wedge gate and double-disc gate. Our complete line of gray iron, malleable iron and bronze pipe fittings — with screwed and flanged ends—includes a type for every purpose. All JARECKI Valves and Fittings are made of the highest quality materials, are correct in every detail of design and are characterized by fine finish.

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See JARECKI Section, Composite Catalog

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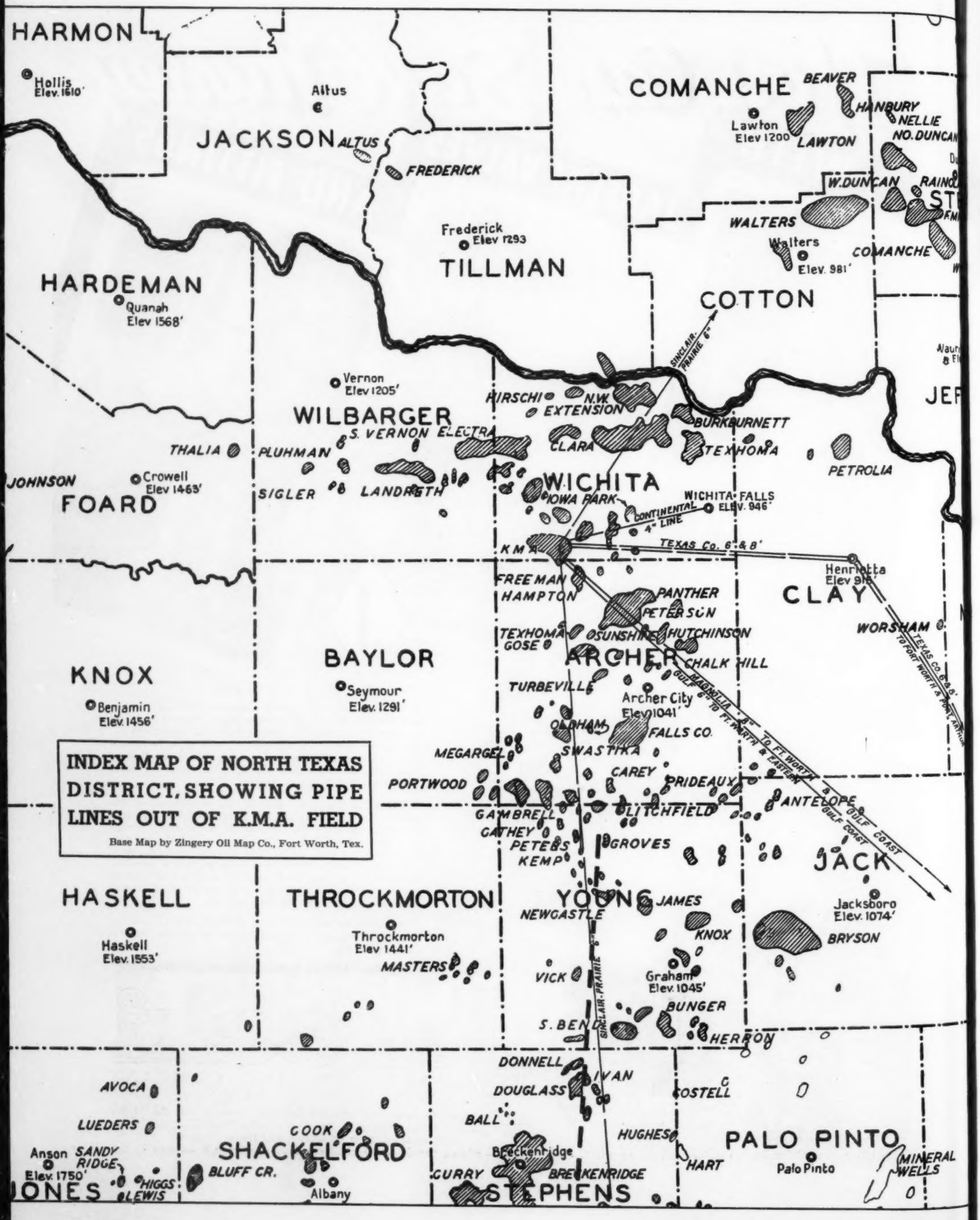
HARMON
Hollis Elev. 1610'
Altus
JACKSON
ALTUS
FREDERICK
COMANCHE
BEAVER
HANBURY
NELLIE
NO. DUNCAN
Lawton Elev 1200
LAWTON
W. DUNCAN
WALTERS
Walters Elev. 981'
COMANCHE
Frederick Elev 1293
TILLMAN
HARDEMAN
Quanah Elev 1568'
COTTON
SINCLAIR-PRAIRIE 6"
Vernon Elev 1205'
WILBARGER
S. VERNON
ELECTRA
HIRSCHI
N.W. EXTENSION
BURK BURNETT
CLARA
TEXHOMA
PETROLIA
THALIA
PLUHMAN
JOHNSON
Crowell Elev 1463'
FOARD
SIGLER
LANDRETH
WICHITA
IOWA PARK
WICHITA FALLS Elev. 946'
CONTINENTAL 4" LINE
KMA
TEXAS Co. 6" & 8"
Henrietta Elev 918'
FREEMAN
HAMPTON
PANTHER
PETERSON
CLAY
TEXHOMA
GOSE
OSUNSHINE
HUTCHINSON
WORSHAM
TEXAS CO 6" & 8" TO FORT WORTH & PORT ARTHUR
KNOX
Benjamin Elev. 1456'
BAYLOR
Seymour Elev. 1291'
ARCHER
CHALK HILL
TURBEVILLE
Archer City Elev 1041'
GULF MAGNOLIA 8" TO FT. WORTH & EASTERN
OLDHAM
FALLS CO.
MEGARGEL
SWASTIKA
CAREY
PRIDEAUX
PORTWOOD
GAMBRELL
LITCHFIELD
ANTELOPE
GULF COAST
GULF COAST
CATHEY
PETERS
KEMP
GROVES
JACK
INDEX MAP OF NORTH TEXAS DISTRICT, SHOWING PIPE LINES OUT OF K.M.A. FIELD
Base Map by Zingery Oil Map Co., Fort Worth, Tex.
HASKELL
Haskell Elev. 1553'
THROCKMORTON
Throckmorton Elev 1441'
MASTERS
YOUNG
NEWCASTLE
JAMES
KNOX
Graham Elev. 1045'
VICK
SINCLAIR-PRAIRIE
Jacksboro Elev. 1074'
BRYSON
BUNGER
S. BEND
HERRON
DONNELL
IVAN
DOUGLASS
COSTELL
BALL
HUGHES
AVOCA
LUEDERS
Anson Elev. 1750'
SANDY RIDGE
COOK
SHACKELFORD
BLUFF CR.
Albany
Breckenridge
CURRY
BRECKENRIDGE
STEPHENS
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We invite you to take advantage of our facilities at Wichita Falls to serve you.

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The BRIDGEPORT MACHINE COMPANY
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HOUSTON L. D. 203 Local "Cap" 1301
DALLAS L. D. 584 Local 2-4282
SAN ANTONIO L. D. 219 Local "Gar" 567
CORPUS CHRISTI L. D. 31 Local 574
SHREVEPORT L. D. 15 Local 6481
ODESSA L. D. 683 Local 684
TULSA L. D. 681 Local 5-3204
OKLAHOMA CITY L. D. 785 Local 7-2725
WICHITA L. D. 59 and 116 Local 2-1431 and 2-1432
AND BRANCH STORES

(Continued from Page 52)

properties at this time. Residue gas is being returned to the sand through one injection well on the Munger lease.

Negotiations are under way for construction of additional gasoline plants in the field.

Natural gas analysis:

At 16 pounds separator pressure, a K.M.A. deep gas sample analyzed as follows:

	Per cent
Methane	59.54
Ethane	12.54
Propane	17.45
Iso-butane	2.46
N-butane	4.72
Pentanes plus	3.29
	100.00

The G.P.M. of 26-70 gasoline, 16 pounds separator pressure, tests 2.19 gallons.

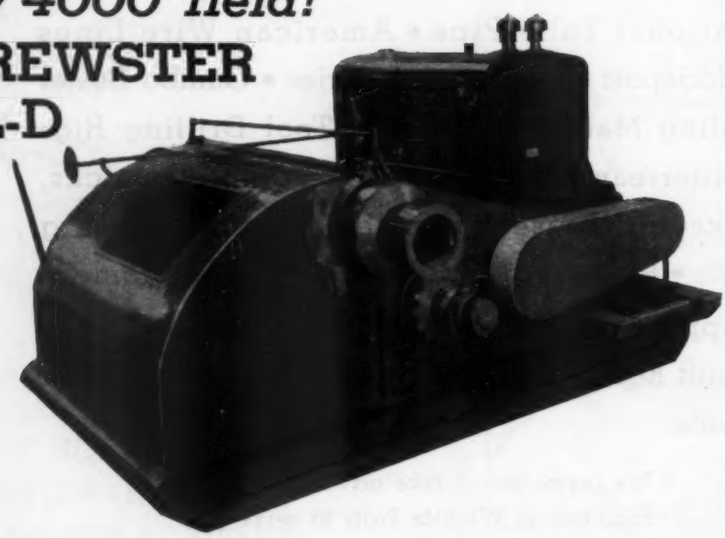
PIPE LINE OUTLETS

Five major trunk lines serve the North Texas district. All of them have connecting lines into K.M.A. Continental Pipe Line Co. 4-inch line, connecting with its Electra-Archer systems, delivers into its Wichita Falls refinery. Texas Pipe Line Co. operates a 6- and 8-inch parallel system out of the field to its Dallas refinery, thence to Port Arthur through Corsicana. At the present time Texas Co. is moving about 90 per cent of the new crude. Magnolia Pipe Line Co. 8-inch line out of Electra, through K.M.A. goes to Fort Worth, thence to Conroe and the Gulf Coast. Gulf Pipe Line Co. 6-inch Burkburnett line through K.M.A. delivers to its West Texas and eastern system near Fort Worth. Sinclair Prairie Pipe Line Co. 4- and 6-inch lines run both north and south out of K.M.A., feeding into the Oklahoma system to the north and into its West Texas and eastern lines near Ranger, Tex.

Here is the ideal motor powered portable draw-works for KMA

...or any 4000′ field!

THE BREWSTER MODEL-D



This model has been specially designed for the driller operating in 3000′ and 4000′ fields. It is unusually compact with weight reduced to a minimum. All working parts are enclosed. It has 10 forward speeds and 2 reverses. Full wrap brakes, air-cooled, self-energizing and fully equalized. Over-size chrome nickel shafts throughout. Self-aligning anti-friction bearings.

MODEL D-336 — 110 h.p. for 3000′ drilling.

MODEL D-448 — 160 h.p. for 4000′ drilling.

Both models available with detachable sand reel.

Write for further details and prices — now!

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Export Office: **Acme Well Supply Company, 136 Liberty Street, New York City**

K.M.A. Drilling Practice

(Continued from Page 45)

tools are very successfully used in the drilling-in of other comparatively low-pressure fields by the use of oil as a circulating medium, or by the use of some cleansing fluid on the hole walls, or scrapers on the face of the unsaturated formation.

Drilling Time

Some few wells have been drilled to the lime top in 15 or 16 days, but an overall of 20 to 22 days is the more common time requirement. Following is a day-by-day log of a typical K.M.A. well drilled with diesel powered portable rotary rig:

Day	Depth or explanation:	Bits used:
1	Rigging up	
2	Rigged up and spudded	
3	Rigging up and W.O.C.S.	
4	Drilling at 354 feet	1st fishtail bit
5	Drilling at 958 feet	2nd fishtail bit
6	Drilling at 1,252 feet	3rd fishtail bit
7	Drilling at 1,561 feet	1st rock bit
8	Drilling at 1,850 feet	3rd rock bit
9	Drilling at 2,124 feet	5th rock bit
10	Drilling at 2,312 feet	
11	Drilling at 2,553 feet	6th rock bit
12	Drilling at 2,605 feet	7th rock bit
13	Drilling at 2,723 feet	
14	Drilling at 2,879 feet	
15	Drilling at 3,031 feet	8th rock bit
16	Drilling at 3,155 feet	9th rock bit
17	Drilling at 3,277 feet	
18	Drilling at 3,444 feet	10th rock bit
19	Drilling at 3,600 feet	
20	Total depth 3,627 feet; Set and cemented 7-inch casing.	

The time required for cable tool drilling through the 200-250-foot section of Kemp City lime varies widely from well to well, depending upon the occurrence of pay levels and upon the amount of penetration which the particular operator desires to take. From three to seven days is normal. If the well is shot, the spudder and equipment is held on location for cleaning out purposes after shooting.

Drilling Costs

Drilling costs per well have been reduced considerably since the early part of 1937 when the development of the deep level began in earnest. Costs of completing wells vary from $22,500 to $27,500 per well (in the tanks) depending to a great extent upon the requirements and wishes of the individual operators. A division of the total well cost is somewhat as follows:

Contract ($3 per ft.)	$12,000
Casing and tubing	7,500
Cement and lumber	2,000
Drilling in with spudder and cleaning out after shot	2,000
Shooting	1,000
Tankage (per well)	500
Total cost	$25,000

Geology of K.M.A. Field

(Continued from Page 47)

The only other deep prospects are those which might occur beneath the Ellenburger lime and these are a matter of much conjecture since ex-

BUY NO WELL HEADS for KMA

Until YOU LEARN ABOUT THESE HERCULES SPECIALTIES

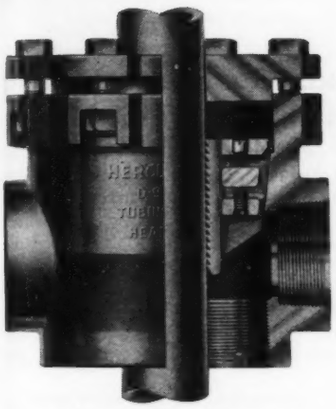

Figure 30—HERCULES Type D-9 Cast Steel Tubing Head with Slips. One-Piece, Full-Opening, 2000 pounds test.

THE HERCULES TYPE D-9 TUBING HEAD — for KMA — is a one-piece, full-opening head, especially suitable for acidizing purposes. Valuable features include: (1) Special Locking Slips that can be operated by *one* man. They are hinged together in one unit and held around tubing by a convenient latch which is easily pressed into locking position by the finger of the operator. When pulling tubing, slips will ride tubing out of head and are easily removed. (2) HERCULES "Overhead-Packing" arrangement above the slips, permits adjustment of pressure on the packing, or repacking if necessary, *without disturbing well hookup.* (3) Body of electric cast steel is tested for 2000 pounds. Two 3" side outlets. Over-all height is approximately 10". All sizes furnished. *Write for descriptive literature.*

THE HERCULES TYPE C CASING HEAD — for KMA — is not illustrated here but is similar in design to our Type D-9 Tubing Head. The Type C Casing Head is recommended for low pressure areas where a slip-type head is desired. The slips are made in three segments, hinged together in a manner similar to the slips of the Type D-9 Tubing Head. Packing is above the slips and is distorted by means of a split packing gland, drawn down by a series of bolts. Body is made of electric cast steel, tested for 1500 pounds. Two 3" side outlets. Over-all height is approximately 15". Made in all sizes. *Write for complete information.*

THE HERCULES TYPE TW TUBING HEAD — for KMA — is actually a *combination* Berry type casing head (bottom section) and a tubing hanger (top section). When necessary to pull the tubing, simply remove the 4 tie-down bolts running through the flanges, and let tubing lift top section out of bottom section; this leaves on the well a *full-opening* Berry pattern casing head with oil-saver top. Except for the flanges, the top section of Type TW is identical to the well-known HERCULES Tubing Hanger (see Figure 10-A). Made of electric cast steel, 1500 pounds test. Two 3" side outlets. Height over-all, 12". *Described in 1938 Composite Catalog, p. 930.*

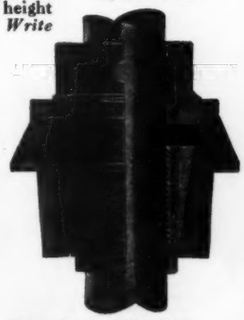

Figure 10-A—HERCULES Tubing Hanger with Slips. For use in Berry Pattern Casing Heads.

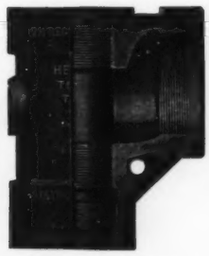

Figure 250—HERCULES Combination Thread Pumping and Flowing Tee. Nickel chrome steel, 3000 pounds test.

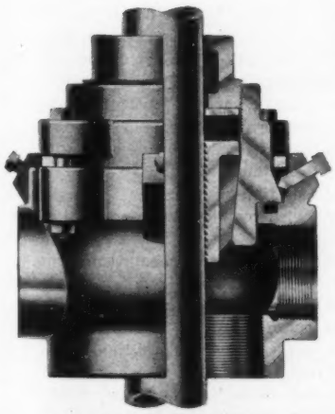

Figure 27—HERCULES Type TW Cast Steel Tubing Head with Slips. A *Combination* Tubing and Casing Head, 1500 pounds test.

THE HERCULES TUBING HANGER— for KMA — offers a number of exclusive features. (1) Forged steel slips completely encircle tubing. (2) The packing is *above* the slips where it can't be broken down or cut out by the weight of the tubing. (3) Slips can't jump out if rods break or drop. (4) Forged steel body will safely support the longest string of tubing. (5) Hanger sits down into any Berry pattern casing head. *See 1938 Composite Catalog, p. 932.*

THE HERCULES COMBINATION THREAD PUMPING AND FLOWING TEE— for KMA — has *both* an upset and a regular thread in bottom, therefore can be used on *either* upset or regular thread tubing. Other features of the Tee include: a regular thread in top; a 90-degree side outlet; a 1" opening in back side. Made of nickel chrome steel, 3000 pounds test. *Fully described in 1938 Composite Catalog, p. 931.*

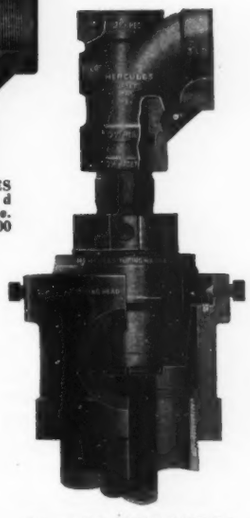

Figure 219—HERCULES Pumping Well Hook-Up, showing HERCULES Tee and Tubing Hanger suspended in Berry Pattern Casing Head.

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tremely little is known of the geologic section below the Ellenburger in this region. Granite has been encountered in several of the fields on the Red River uplift but it is impossible to foretell whether this will be the case in every field in the region. The thickness of the Ellenburger is also a matter of speculation in this area. Deep Oil Development Co. No. 1 Munger penetrated nearly 1,200 feet of this formation before plugging back to the K.M.A. lime.

Regional Significance

Viewed from a strictly geological position, the regional significance of the K.M.A. field depends entirely on whether the producing horizon is Bend or Strawn. If it is Strawn then it has a wide application since other Strawn fields may be expected in this horizon wherever they may be located and under whatever structural conditions they may be found—either similar or dissimilar to the conditions in K.M.A. If the K.M.A. lime should prove to be of Bend age the regional significance is considerably lessened.

Viewed from the standpoint of development, the regional significance is great since it will encourage new operations in a large portion of North Texas and will almost certainly lead to the discovery of new fields—whether they produce from the K.M.A. lime or from some other oil producing horizon.

Each deep well drilled will naturally add to the sum total of geological knowledge and information and will thus serve the interest of both science and industry.

K.M.A. One of Largest Areas

(Continued from Page 43)

151,000 bbls. of oil by pumping up to the time it was offset on three sides by flowing wells all making 1,000 bbls. per day or more.

In light of the fact that horizontal permeability seems to be somewhat limited (as shown by physical tests) it appears as if the drainage area of the discovery well did not far exceed a 10-acre area, pointing to a recovery of 15,000 bbls. per acre around the discovery well. This well is situated in the Kemp City or central portion of the field, and all geologists agree the western portion where greater thicknesses of saturated true sand are encountered, will yield considerably more oil per acre than the Kemp City area. Local variations in structure, and like variations in porosity, will of course govern the yields throughout this immense structure.

From these early deductions, the round figure of 400,000,000 bbls. of new reserves for the Kemp City lime portion of the K.M.A. field seems reasonable, assuming a productive area of from 40,000 to 50,000 acres, and a yield of from 8,000 to 10,000 bbls. per acre. As before stated, any one of the several outpost tests now in the stage of completion could add materially to the producing area and the field's ultimate recovery.

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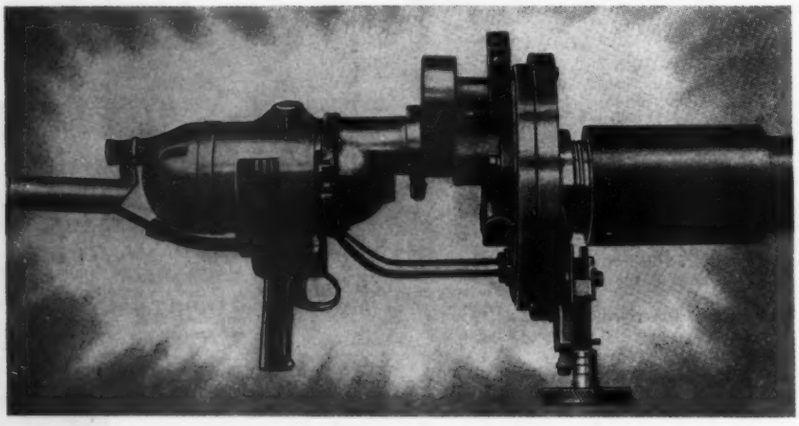

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Mr. Meade (Shorty) Wolfe is our representative in the K. M. A. field.

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Panhandle Gas Fuel for Drilling Through United Pipe Line

Gas fuel for drilling rigs in the K.M.A. field, Wichita County, Texas, is to be supplied by United Gas Pipe Line Co. which is laying a 6-inch line to the field from a connection with its 8-inch Wichita Falls-Olney main line. The latter line passes near the eastern edge of the field which is about 20 miles southwest of Wichita Falls.

The K.M.A. feeder line, which will be about 4 miles long, will extend to a point near the center of the field whence lines will be laid as needed.

Panhandle gas supplies the system. The Olney line, which is approximately 75 miles long, ties in with United 16-inch trunk line from Wichita Falls to Shamrock, in the Panhandle, at a point north of Wichita Falls.

Log of K.M.A. Discovery Well

Deep Oil Development Co. No. 1 Munger was drilled in 1930 as a deep test of the K.M.A. shallow structure. After drilling to 5,430 feet it was plugged back for a test of upper showings and completed as a 125-bbl. pumper in the deep pay section. The log of the well follows:

Surface to 1,550 ft., sand and gravel.
1,550-1,640 feet, brown shale.
1,640-1,680 feet, shale.
1,680-1,710 feet, lime and sand.
1,730-1,732 feet, lime.
1,732-1,770 feet, Freeman-Hampton sand, show of oil.
1,770-2,130 feet, brown shale, sand and lime.
2,130-2,140 feet, Gose sand, dry.
2,140-2,200 feet, sand, lime and shale.
2,200-2,210 feet, dry lime and sand.
2,210-2,265 feet, sandy shale and lime shells.
2,265-2,280 feet, lime.
2,280-2,500 feet, shale, lime and loose sand.
2,500-2,850 feet, broken sand, lime and shale.
2,850-2,885 feet, sand.
2,885-3,648 feet, shale, streaks of lime and sand.
3,648-3,715 feet, K.M.A. lime, showing oil.
3,715-3,750 feet, lime and sand, showing oil.
3,750-3,850 feet, lime sand and shale, showing oil at 3,790-3,850 feet.
3,850-3,890 feet, sand and Oolitic lime.
3,890-3,960 feet, lime, showing of oil at 3,900 and 3,930 feet.
3,960-4,250 feet, shale and lime.
4,250 feet, top Ellenberger.
4,290 feet, top Dolomite.
4,250-4,860 feet, lime.
4,860-5,410 feet, sand and lime.
5,410-5,430 feet, broken lime and sand.
5,430 feet, total depth.
Plugged back and completed in K.M.A. lime as small producer.

North Texas Oil and Gas Men Have Active Association

The North Texas Oil and Gas Association was organized in January, 1930, by a group of independent operators in Wichita Falls, and has grown

R. L. UNDERWOOD

to be one of the most active independent oil-producing groups.

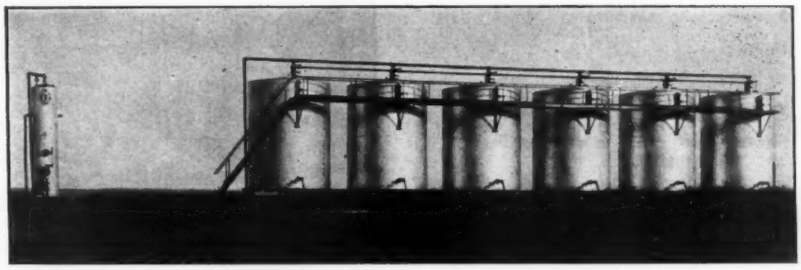
R. L. Underwood, independent operator of Wichita Falls, is president for the 1937 term of the association; J. Ed Erwin executive vice president with offices in the City National Bank Building, Wichita Falls. C. W. Boller is first vice president,

J. ED ERWIN

and C. J. Tucker second vice president, both independent oil men in the North Texas district. Forty-five of the district's prominent oil men serve on the association's board of directors.

This association has rendered very active assistance and cooperation to the Texas Mid-Continent Oil and Gas Association, the I.P.A.A., the A.P.I., and the National Stripper Well Association in their various endeavors.

K.M.A. goes M & V



Battery of M & V Tanks and Separator at K.M.A.

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K.M.A. goes M & V, as immediate delivery to the field is assured from the M & V Factory, located in Wichita Falls, from where it serves the oil industry of the world with M & V Storage Tanks and Separators.

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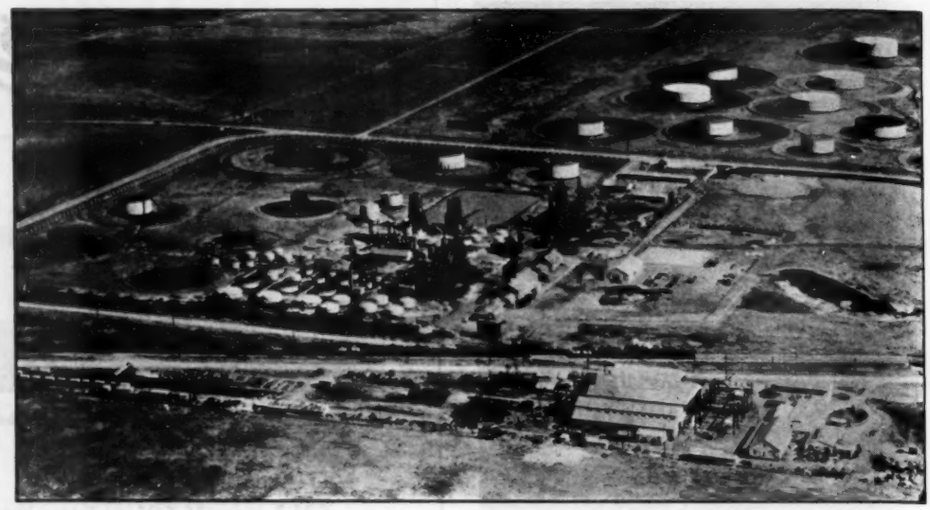
K.M.A. Field Assures Refineries Future Oil Supplies



Panhandle Refining Co.'s 4,000-bbl. refinery at Wichita Falls

Refineries located in the immediate vicinity of the new K.M.A. oil field and those located throughout the North Texas area generally should benefit from the future intensive development in the K.M.A. field. At present there are three refineries operating in Wichita Falls, Texas, and one additional plant of 3,250 bbls. daily capacity remains idle after a shutdown of several months, but it, too, could easily be placed on stream on short notice.

Refineries located in the Wichita Falls area and throughout North Texas generally at times have felt the pinch of the declining crude supplies in that vicinity.

In the early days of the North Texas oil boom, Wichita Falls and other major North Texas cities and towns identified themselves as important refining centers. Then through the years as some of the older oil producing fields were depleted and pipe lines carried much of the oil to other refining areas, the North Texas group of refiners felt the need of crude. In many instances plants were abandoned because of a shortage of oil.

With the discovery of the new deep K.M.A. field, a new hope may be kindled. At the same time, it should be understood that major changes have come into refining routine that work against wholesale refinery construction programs, particularly construction programs that call for the erection of ordinary skimming plants.

This type of refinery can no longer produce the quality of gasoline that meets modern motor fuel requirements unless antiknock additives are blended with the gasoline or the crude processed has unusual antiknock properties. In the first instance the blending costs are usually high and the quality of the crude in the K.M.A. field is such that it can not be said to produce gasolines of exceptionally high octane value.

It is also evident that the local market for the refined products is being adequately supplied at present so any new refineries locating in the field as a result of the new oil production, will be forced to seek more distant markets to dispose of their products. This will bring the group into immediate competition with the Gulf Coast plants to the south, with the West Texas refineries to the west, Oklahoma to the north and the East Texas group, on any products to be supplied in the middlewest or central states.

In summary, it may be pointed out that the Wichita refining area will likely benefit from the new field through the guarantee of an adequate supply of crude oil for a long time into the future

Continental Oil Co.'s 4,000-bbl. refinery located at Wichita Falls

rather than through a wild refinery building program that might be anticipated.

A further deterrent to any substantial refinery building program is the fact that major pipe lines are already located in and near the field and these will take a substantial portion of the oil to other refining areas.

One of the largest active refineries is maintained on the Burkburnett road out of Wichita Falls by the Continental Oil Co. Although daily production varies with seasonal demand, the Continental plant produces about 3,000 bbls. of gasoline in three grades, kerosene, fuel and other products.

Equal in size is the Panhandle refinery, across the road from Continental. Its estimated production every day is 2,000 bbls. of gasoline in six grades, two kerosenes, 10 grades of naphtha, one zero gas oil and one fuel oil.

The third operating plant is that of Falls refinery, its plant nearby on the Iowa Park road. Handling approximately 1,500 bbls. of crude daily, the refinery output includes three grades of gasoline, kerosene, tractor fuel, diesel fuel, distillate, naphtha, lubricating oils and greases.

Plans have not been announced regarding further operation of the Taxman refinery, which recently closed down, although the equipment remains intact on the location north on the old Burkburnett road.

Five major pipe lines already serve the field, namely the Sinclair Prairie Pipe Line Co. which operates a 6-inch line that passes through the field and runs oil northward: the Magnolia Petroleum Co. 8-inch line running to company's refineries at Ft. Worth and Beaumont, Texas: the Gulf Pipe Line Co. 6-inch line to the Gulf Coast: the Texas Co. system of a 6-inch and an 8-inch line terminating at Port Arthur and running through Fort Worth, and a 4-inch line laid by the Continental Oil Co. to connect the field with its refinery at Wichita Falls.

The Texas Co. facilities take the oil to the Henrietta pump station for further distribution. Magnolia has a pump station at Electra, facilities extending to South Burkburnett, to Petrolia and thence out of the immediate area.

Connections of Sinclair Prairie Co. gather oil from around Electra, through Archer County to a pump station near Jacksboro. The Gulf pipe line facilities extend from Electra through Burkburnett and south to Fort Worth.

Production handled by Continental is dispatched to its refinery plant in Wichita Falls, and that of the Waggoner company is from its fields to the refinery at Electra.

Bell Oil & Gas Co. gathers throughout the Burkburnett area and the crude is run to its plant in Tillman County.

Although Shell runs a 10-inch pipe line through the area, it does not gather in the immediate vicinity.

KMA AND OTHER DISTRICTS

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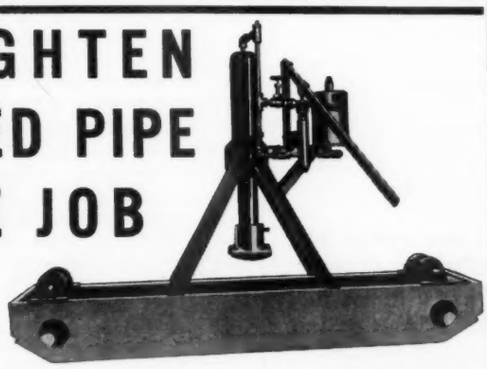

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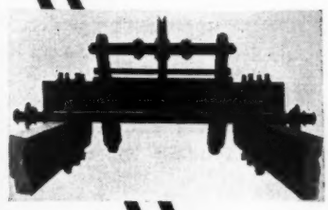

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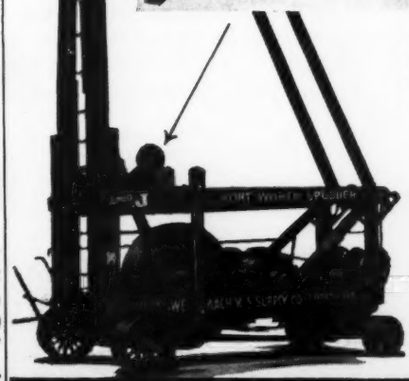

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B

Bohner Co.-First National Co. No. 1 W. V. F. L. Survey, blocks 28 and 29, 3,851 feet, 1,147 bbls. 24 hours; Bohner Co. Munger No. 1, W. V. F. Survey block 31, 3,847 feet, 768 bbls. 24 hours; L. T. Burns First National Co. No. 14, W. V. F. Survey, block 29, 3,868 feet, 811 bbls.; L. T. Burns First National Bank Co. No. 15, W. V. F. Survey, block 29, 3,863 feet, 838 bbls. 24 hours; L. T. Burns First National Co. No. 17, W. V. F. Survey, block 29, 3,835 feet, 771 bbls. 24 hours. L. T. Burns First National Co. No. 16, W.V.F. Survey, block 29, 3,848 feet, 136 bbls. four hours; L. T. Burns First National Co. No. 19, W.V.F. Survey, block 29, 3,830 feet, 210 bbls. six hours; L. T. Burns First National Co. No. 21, W.V.F Survey, block 29, 3,845 feet, 231 bbls. in six hours; L. T. Burns Munger No. 1 W.V.F. Survey, block Munger Brothers subdivision, 3,886 feet, 20 bbls. 24 hours.

C

Christie-Hickman Drilling Co. W. P. Lowry No. 1, W.V.F. Survey, block 23, 3,683 feet, 345 bbls. 12 hours; Christie-Hickman Van Meter No. 1 W.V.F. Survey, blocks 34 and 35, 3,903 feet, 40 bbls. 24 hours; Consolidated Oil Co. Ferguson No. 1 W. H. Spillers Survey, abstract 257, 3,760 feet, 612 bbls. 12 hours; G. W. Cooper et al J. A. Kemp estate No. 1, W.V.F. Survey, lot 2, block 16, 3,855 feet, 300 bbls. five hours.

D

Deep Oil Development Co.-First National Co. No. 1 W.V.F. Survey, block 29, 3,911 feet, 150 bbls. 24 hours (estimated); Deep Oil Development Co.-First National Co. No. 2 W.V.F. Survey, block 29, 3,875 feet, 564 bbls. 17 hours; Deep Oil Development Co.-First National Co. No. 3 W.V.F. Survey, block 29, 3,806 feet, 513 bbls. 16 hours. Deep Oil Development Co.-First National Bank No. 4 W.V.F. Survey, block 29, 3,841 feet, 525 bbls. 24 hours; Deep Oil Development Co.-First National Co. No. 5 W.V.F. Survey, block 27, 3,846 feet, 124 bbls. four hours; Deep Oil Development Co. Munger No. A-1 (discovery well) W.V.F. Survey, block 30, 3,911 feet, 125 bbls. 24 hours (estimated); Deep Oil Development Co. Munger No. A-2 W.V.F. Survey, block 30, 3,920 feet, 80 bbls. 24 hours (estimated); Deep Oil Development Co. Munger No. A-3 W.V.F. Survey, block 30, 3,890 feet, no test; Deep Oil Development Co. Munger No. A-4 W.V.F. Survey, block 30, 3,890 feet, 405 bbls. 24 hours; Deep Oil Development Co. Munger No. A-5 W.V.F Survey, block 25, 3,882 feet, 20 bbls. (estimated), 24 hours, (purchase from E. J. Stump); Deep Oil Development Co. Munger No. A-6 W.V.F Survey, block 25, 3,878 feet, 422 bbls. 12 hours. Deep Oil Development Co. Munger No. A-7 W.V.F. Survey, block 25, 3,881 feet, 402 bbls. 12 hours; Deep Oil Development Co. Munger No. A-8 W.V.F Survey, block 25, 3,863 feet, 268 bbls. eight hours; Deep Oil Development Co. Munger No. A-9 W.V.F Survey, block 25, 3,827 feet, 305 bbls. 24 hours; Deep Oil Development Co. Munger No. A-10 W.V.F Survey, block 25, 3,865 feet, 625 bbls. six hours; Deep Oil Development Co. Munger No. A-11 W.V.F Survey, block 25, 3,870 feet, 538 bbls. 24 hours; Deep Oil Development Co. Munger No. A-12 W.V.F Survey, block 25, 3,878 feet, 528 bbls. 24 hours; Deep Oil Development Co. Munger No. A-13 W.V.F Survey, block 25, 3,898 feet, 531 bbls. 24 hours; Deep Oil Development Co. Munger No. A-14 W.V.F Survey, block 25, 3,835 feet, 181 bbls. six hours; Deep Oil Development Co. Munger A. No. 1, W.V.F Survey, lot 15, 3,839 feet, 344 bbls. eight hours; Deep Oil Development Co. Munger C No. 1, 3,866, 534 bbls. 24 hours; Deep Oil Development Co. Munger C No. 2, W.V.F. Survey, block 25, 3,826 feet, 521 bbls. 15 hours; Deep Oil Development Co. Munger D. No. 3, 3,886 feet, 528 bbls. 24 hours; Deep Oil Development Co. Munger E. No. 1, W.V.F. Survey, block 25, 3,830 feet, 506 bbls. 24 hours; Deep Oil Development Co. Munger E. No. 2, W.V.F. Survey, block 30, 3,825 feet, 218 barrels, 12 hours; Deep Oil Development Co. Munger F. No. 1, W.V.F. Survey, block 30, 3,885 feet, 335 bbls. 12 hours; Deep Oil Development Co. Munger F. No. 2, W.V.F Survey, block 30, 3,885 feet, 546 bbls. 24 hours; Deep Oil Development Co. Munger G. No. 1, W.V.F. Survey, block 30, 3,881 feet, 712 bbls. 24 hours; Deep Oil Development Co. Munger H. No. 1, W.V.F. Survey, block 30, 3,855 feet, 511 bbls. 24 hours; Deep Oil Development Co. Munger H. No. 3, W.V.F Survey, block 30, 3,850 feet, 244 bbls. six hours.

G

Grace and Woods Hodges No. 1, H. B. Balch Survey, block 126, 3,909 feet, 557 bbls. 24 hours.

H

Hammond-Hanlon Fossett-Tuttle No. 1, E. T. R. R. Co. Survey, abstract 76, 4,018 feet, 182 bbls. two hours; Hammond-Hanlon Strauss No. 1, W.V.F. Survey, block 22, 3,890 feet, 40 bbls. 24 hours.

K

Kadane-Griffith Oil Co. et al J. A. Kemp Estate No. 1, F. Peterswick Survey, block 1, 3,752 feet, 2,086 bbls. 12 hours; King Oil Co. Mitchell No. 1, P. Castleman Survey, block 36, 3,842 feet, 257 bbls. 12 hours.

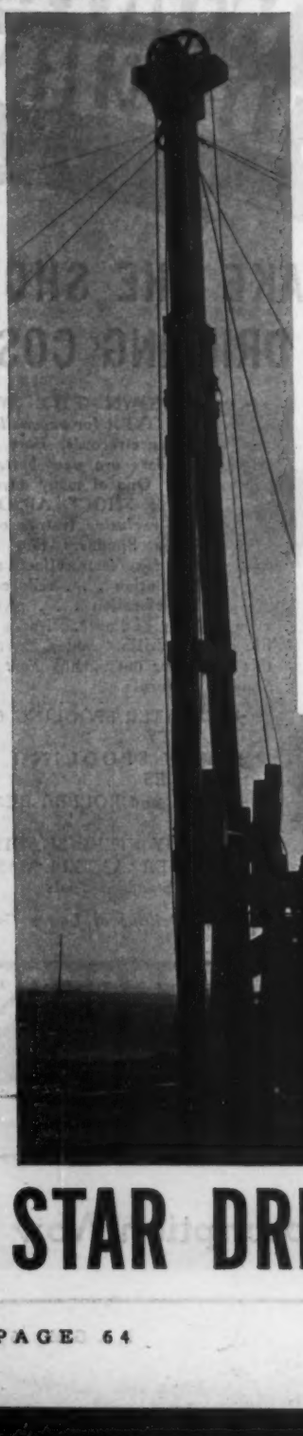
L

Lebus et al Lewis No. 1, K.W.V.L. Survey, block 20, 3,795 feet, 54 bbls. two hours.

M

Jack H. Martin Taylor No. 1, W.V.F. Survey, block 35, 3,899 feet, 40 bbls. 24 hours (estimated);

NO. 45C STAR SPUDDER



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With 4,000 feet capacity, chain-driven reels, plenty of power and a real drilling motion, the No. 45 Star Spudder will do its work quickly and economically.

Write for bulletin describing the various models of the Star 45, and other machines to The Star Drilling Machine Co., Akron, Ohio, or to one of these branches: Chanute, Kansas—Abilene, Texas—Portland, Oregon.

STAR DRILLING MACHINES

Melat and Graham Munger A. No. 1, W.V.F. Survey, block 25, 3,887, 146 bbls. 24 hours; Melat and Graham Munger A. No. 2, W.V.F. Survey, block 25, 3,867 feet, 700 bbls. 24 hours; Melat and Graham Munger B. No. 1, 3,865 feet, W.V.F. Survey, block 25, 228 bbls. 12 hours; Melat and Graham Munger B. No. 2, W.V.F. Survey, block 25, 3,870 feet, 344 bbls. 8 hours; Melat and Graham Munger C. No. 1, W.V.F. Survey, block 25, 3,878 feet, 90 bbls, four hours; Melat and Graham J. J. Waggoner No. 1 W. R. Eaves Survey, 3,918 feet, 122 bbls. 2 hours.

O

Omohundro W. B. First National Co. No. 1, W. V.F. Survey, block 28, 3,851 feet, 1,098 bbls. 24 hours; Omohundro W. B. et al First National Co. No. 1, W.V.F. Survey, block 27, 3,850 feet, 735 bbls. 24 hours.

P

Petroleum Producers First National Co. No. 73, W.V.F. Survey, block 29, 3,879 feet, 310 bbls. 10 hours; Petroleum Producers First National Co. No. 74, W.V.F. Survey, block 29, 3,867 feet, 269 bbls. 12 hours; Petroleum Producers First National Co. No. 75, W.V.F Survey, block 29, 3,885 feet, 219 bbls. nine hours; Petroleum Producers First National Co. No. 76, W.V.F. Survey, block 29, 3,858 feet, 172 bbls. seven hours; Petroleum Producers First National Co. No. 77, W.V.F. Survey, block 29, 3,849 feet, 643 bbls. 12 hours; Petroleum Producers First National Co. No. 78, W.V.F. Survey, block 29, 3,858 feet, 552 bbls. 24 hours; Petroleum Producers First National Co. No. 80, W.V.F. Survey, block 29, 3,828 feet, 576 bbls. 12 hours; Petroleum Producers First National Co. No. 81, W.V.F. Survey, block 29, 3,850 feet, 728 bbls. 24 hours; Petroleum Producers First National Co. No. 82, W.V.F. Survey, block 29, 3,867 feet, 651 bbls. 24 hours; Petroleum Producers First National Co. G. No. 1, W.V.F. Survey, block 28 and 29, 3,832 feet, 531 bbls. 24 hours; Petroleum Producers First National Co. H. No. 1, Moses Roberts Survey, block 28, 3,852 feet, 840 bbls. 24 hours.

R

Reed, Glass and Crenshaw First National Co. No. 11, Moses Roberts Survey, block 26, 3,845 feet, 540 bbls. 24 hours; Reed, Glass and Crenshaw First National Co. No. 12, Moses Roberts Survey, block 26, 3,846 feet, 625 bbls. 24 hours; Reed, Glass and Crenshaw First National Co. No. 13, Moses Roberts Survey, block 26, 3,845 feet, 600 bbls. 24 hours.

S

Shaffer Oil Co. Ferguson No. 1, F. Peterswick Survey, block 1, 3,886 feet, 83 bbls. 2 hours; Staley Oil Co. First National Co. No. 1, F. Peterswick Survey, block 1, 3,878 feet, 724 bbls. 24 hours; Staley Oil Co. Munger No. 1, W.V.F. Survey, block 16, 3,878 feet, 600 bbls. 24 hours.

Late Completions

L. T. Burns No. 21 First National Co., 3,621-3,843 feet, 950 bbls.; A. L. Cato No. 1 J. A. Kemp, 3,685-3,742 feet, 1,210 bbls. flowing through casing; Christie-Hickman No. 1, W. P. Boulding, 3,612-3,750 feet, 700 bbls; W. H. Peckham No. 1 Munger, 3,715-3,867 feet, 710 bbls.; Petroleum Producers Co. No. 2 First National Co. 3,683-3,860 feet, 750 bbls.; Reed, Glass & Crenshaw No. 13 First National Co. B, 3,632-3,845 feet, 600 bbls.; Harrell & Eddleman and others No. 1 First National Co. 3,637-3,855 feet, 1,440 bbls. in 24 hours; Wichita Falls Cotton Oil Co. No. 1 fee, 3,661-3,730 feet, 1,930 bbls. in 22 hours; Deep Oil Development Co. No. 2 Munger H, 3,682-3,843 feet, 500 bbls; King Oil Co. No. 1 J. and J. Waggoner, 3,761-93 feet, 615 bbls.; Petroleum Producers Co. No. 83 First National Co. 3,655-3,838 feet, 555 bbls.; Reed, Glass & Crenshaw No. 14 First National Co. B, 3,638-3,846 feet, 750 bbls.; Melat & Graham No. 1 J. L. and T. J. Waggoner, 3,806-4,000 feet, 480 bbls.; W. B. Omohundro, Stanley and others No. 1 First National Co. 3,640-3,850 feet, 1,250 bbls.; Petroleum Producers and others No. 1 First National Co. H, 3,677-3,842 feet, 1,250 bbls.

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Today we can serve K. M. A. better than ever with complete modern stocks and larger personnel.

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Plainview, Texas.

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MAPS

K-M-A FIELD
(2000-foot scale)

WICHITA COUNTY
(4000-foot scale)

Both carry up-to-the minute information

Cloth, $8.00; paper $5.00

Other late ownership maps of North Central and West Texas counties.

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Wichita Falls, Texas

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REPRESSURING
INSTALLATION OPERATION

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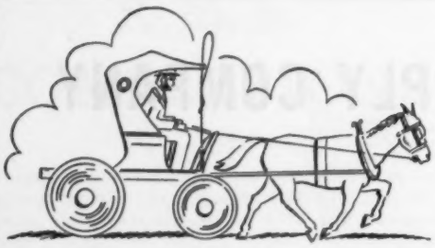
GAS MEASUREMENT PERMEABILITY
COMPRESSOR PLANTS POROSITY
BOTTOM HOLE PRESSURE SATURATION
GAS OIL RATIOS RECOVERABLE OIL
CONTROL OF FLOW THRU FORMATION



THERE'S NO PLACE ON THE MODERN DRILLING RIG FOR

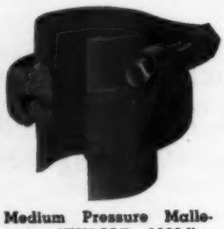
Hoss'n Buggy Unions!

"Big inch" UNIBOLT 2000-lbs. test, 1000-lbs. C.W.P.

Because of their unique design, UNIBOLT Couplings are saving operators many an hour of precious rig time. Take, for example, just one application of the UNIBOLT for "big inch" pipe—slush pump suctions: One man can make or break a UNIBOLT connection on an 8" or 10" suction line in two or three minutes, whereas it usually takes two men an hour to do the same job with a multiple bolt flange union. Frequently, a new gasket must be cut for the flange union which calls for still more time, while the reversible and replaceable resilient seat ring in the UNIBOLT Coupling is good for years of service on suction lines. In addition to reducing costly rigging up and tearing down time, the UNIBOLT for "big inch" pipe eliminates the need of a gate valve for pump compounding. A blanking plug, made especially for use with this UNIBOLT for dead-ending lines, can be installed quickly and easily to provide a positive shut-off.

High Pressure Steel UNIBOLT 6000-lbs. test, 3000-lbs. C.W.P.

The High Pressure Steel UNIBOLT and Medium Pressure Malleable UNIBOLT with replaceable seat rings and parts have become equally popular with cost-conscious operators.



Medium Pressure Malleable UNIBOLT 1000-lbs. test, 500-lbs. C.W.P.

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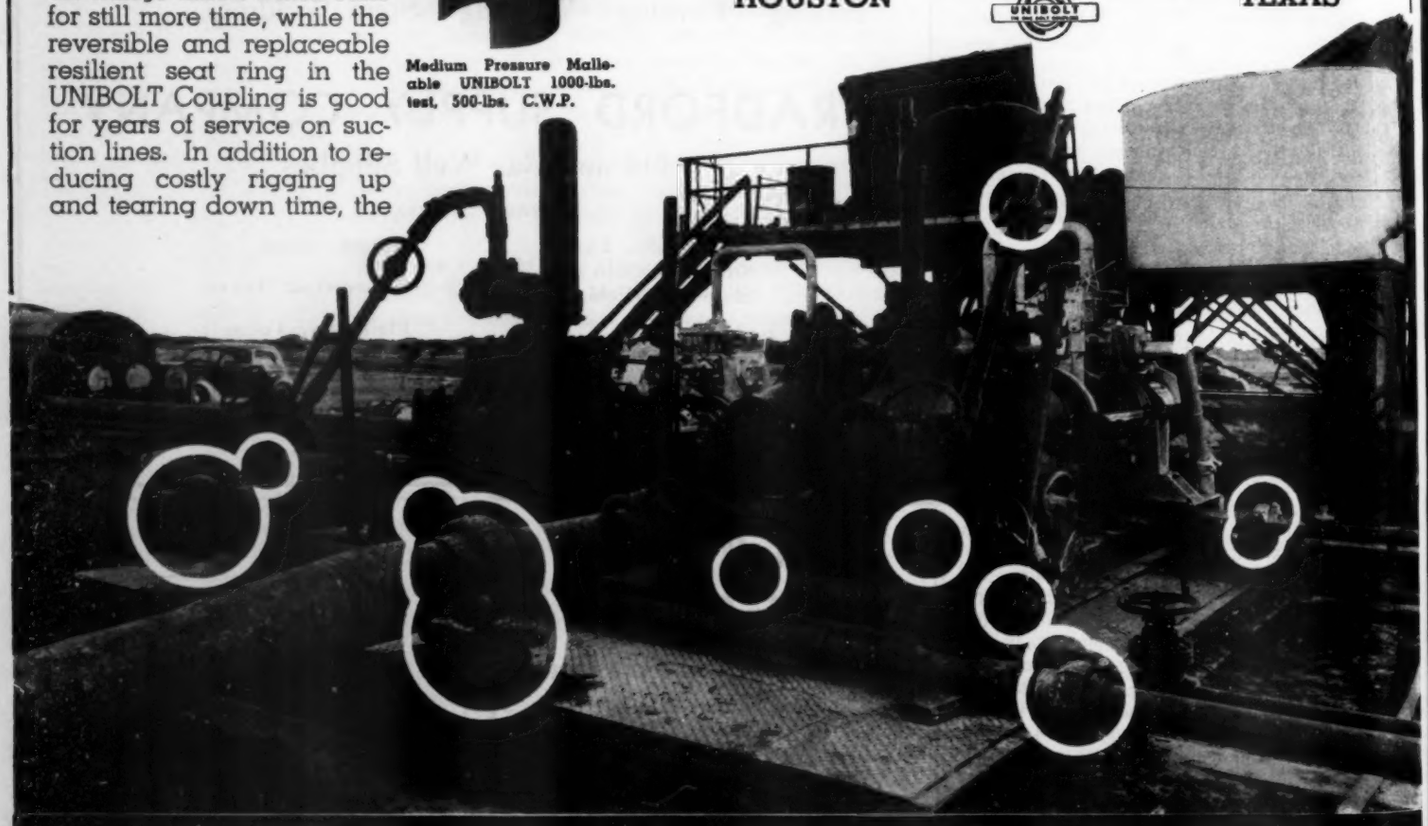

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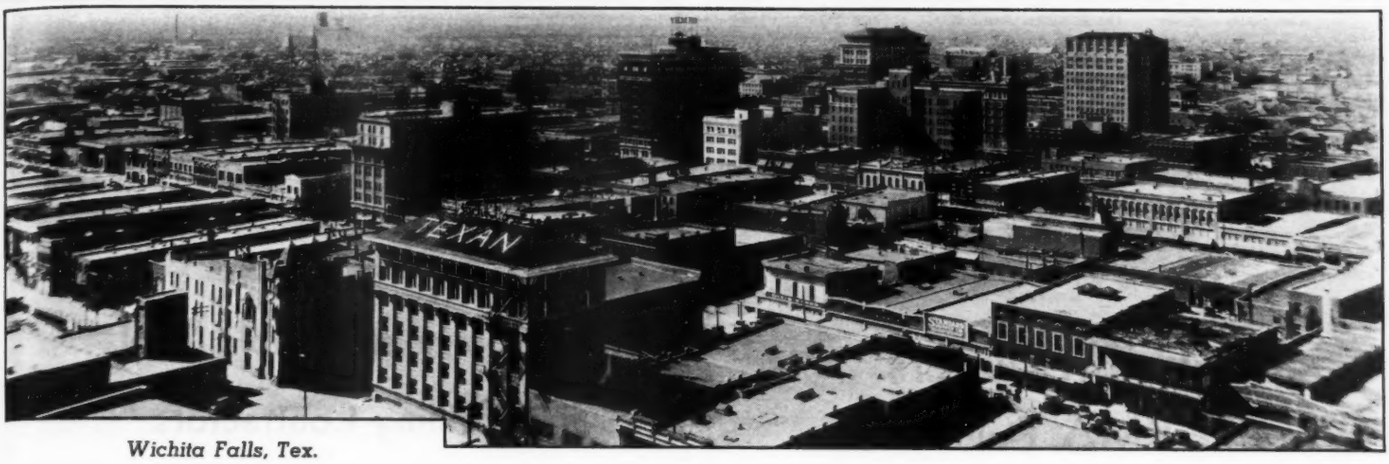

Wichita Falls, Tex.

Wichita Falls Is Getting Ready For Prosperous Days Ahead

With the new deep development of the K.M.A. field now under way, Wichita Falls, county seat of Wichita County, Texas, and for many years a center of important producing and refining operations, looks forward to fresh expansion. Instead of a new boom town rising in the field itself, Wichita Falls, with its office buildings, banks, stores, railroad facilities, improved highways radiating in all directions, and its organized flow of commercial life, provides oil men flocking to the field with the conveniences of an established city.

That city, with a normal population of around 55,000, is already feeling the effects of increased demands upon its facilities, and leaders in its business life are planning for the greater urgency that is expected to develop with the arrival of more and more oil men. The influx of visitors has created something of a scarcity of living quarters. A recent survey conducted by the real estate board disclosed that furnished apartments and houses are difficult to find, W. C. Hamilton, retiring president of the board, said.

Listing Available Room

Allen T. Bryce, new president of the board, confirms the correctness of Mr. Hamilton's statement, but adds that the chamber of commerce is conducting a systematic listing of all room available for use as office or living quarters.

When renters learn that the K.M.A. field is not something ephemeral, more permanent locations will be sought, and building activity will start, Mr. Bryce believes.

Mr. Bryce figured that with 200 wells flowing annually at K.M.A., a total of $5,000,000 monthly should come into Wichita Falls. Much of that amount, he said, would be spent because one-half of the cost of a well is for labor, and laborers spend money.

The brisk demand for space is recalling conditions that prevailed in Wichita Falls almost 20 years ago, at the time of the Burkburnett and Ranger booms. World War soldiers released from camps and from overseas service swarmed to these fields, along with lease and land men, prospectors, producers, oil scouts and men in other divisions of the oil industry. Wichita Falls then, as it is now, was the center of activity. Front yards were rented by men who set up crude offices there for the sale of leases, stock in oil companies, or the scores of gadgets that street venders offer in the cities.

The frantic cry for space in which to transact business led to the construction of new hotels and office buildings. When the excitement subsided, Wichita Falls settled down into the progressive oil town which it is today.

Could They Have a New Ax?

Many stories are told of the startling turn which oil made in the fortunes of land owners. For years the farmers in the Burkburnett and Ranger districts had felt the pinch of poverty, and when drouth brought additional misery, a public fund, contributed to generously by Wichita Falls citizens, was raised to relieve the more acute cases of distress. Then oil was found, and destitution was turned to riches. One farmer who received $500,000 for his land hurried delightedly to his wife, told her he was rich and wanted to do something for her. She thought dazedly for a few moments and then ventured: "I wonder if we could buy a new ax. The old one's got nicks in it."

There is little likelihood that Wichita Falls will witness such incidents in the new development now beginning at K.M.A., but there is already much of the excitement which attends the opening of a big oil field, and there is general confidence that the city faces a long period of solid prosperity.

Oil-field supplies fill great warehouses and open-air storage space in Wichita Falls. Important manufacturers and sales organizations are seeing to it that everything needed in the development of an oil field is conveniently at hand for operators in the K.M.A. field. These establishments, which do hundreds of thousands of dollars worth of business in North Texas, foresee tremendous demands on their facilities.

The city has 114 manufacturing plants, which find national and international markets. Refineries, oil equipment factories, flour mills, glass plants, an air-conditioning equipment factory, a farm equipment factory, foundries, machine shops and a garment factory are a few which go to make up a progressive industrial picture.

The community during the past two decades has developed into an important jobbing center, with local houses handling the distribution of nearly all products in demand in this section. There are 684 retail stores serving Wichita Falls and its retail trading area, with new stores being opened rapidly to reap the benefit of the K.M.A. activity.

Stabilizing this commercial, industrial and agricultural income Wichita Falls has three national banks, with resources of $23,726,956.08; an irrigation system, to prevent drouth failures; estimated oil reserves to provide continued prosperity for 35 years; a sound city government, using the city manager plan, with its finances in good shape; important municipal buildings already constructed; transportation facilities embracing four railroads, with 7 outlets, 40 truck and bus lines, five federal highways and regular daily air schedules.

Women's activities are centered in the Woman's Forum, an organization embracing the majority of clubs and groups in which women are interested. The forum owns its own beautiful building in Country Club estates. Memorial Auditorium, erected in 1927 at a cost of $601,081, houses municipal and welfare organization offices. Here, too, is the auditorium seating 3,200, for community meetings.

Parks and Recreation System

The local park system embraces 21 parks, valued with improvements at $869,251.39. A city recreation system is now in operation for well-directed use of these facilities. Two sporty grass green golf courses attract hundreds the year around. Three lakes, impounding 600,000 acre-feet of water, offer fishing, hunting, boating and other water sports. Sailing has become popular and adherents of this sport have built a club house on the banks of Lake Wichita. Numerous outdoor swimming pools are located in various sections of the city. Westmoreland pool is the largest in the Southwest.

Five modern moving-picture houses, lighted playground, ball diamonds, lakeside park, a brilliantly lighted stadium seating 8,000 and a baseball park seating 10,000 are among the city's entertainment attractions.

Three daily and two weekly newspapers and radio station KGGO bring to Wichita Falls the news of the world. A well-equipped fire department has six stations and 43 employes. The police department employs 40 men.

Wichita Falls is 55 years old. The coming of the first Fort Worth & Denver train on September 27, 1882, is recognized as the first birthday.

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Superheater Attached to Boiler Used on Deep Test Rotary

By J. P. O'DONNELL

Since the days of Drake and the discovery of oil in Titusville, Pa., in 1859, the cable tool method of drilling for oil and gas has been used exclusively in the eastern fields of the United States. The rotary method of drilling adopted in western fields in the early 1900's did not penetrate into the eastern fields due to economic factors which favored the continuation of the cable tool method. However, with the ever increasing search for oil and gas and as a result of geophysical surveys, much interest has been created in the deeper Pennsylvania horizons, particularly those below 5,000 feet. Deep tests drilled with cable tools during the past two or three years have definitely proved, insofar as eastern fields are concerned, the physical and economical limitations of cable tools in drilling to the deeper horizons, particularly with the hazards of caving formations and gas pockets.

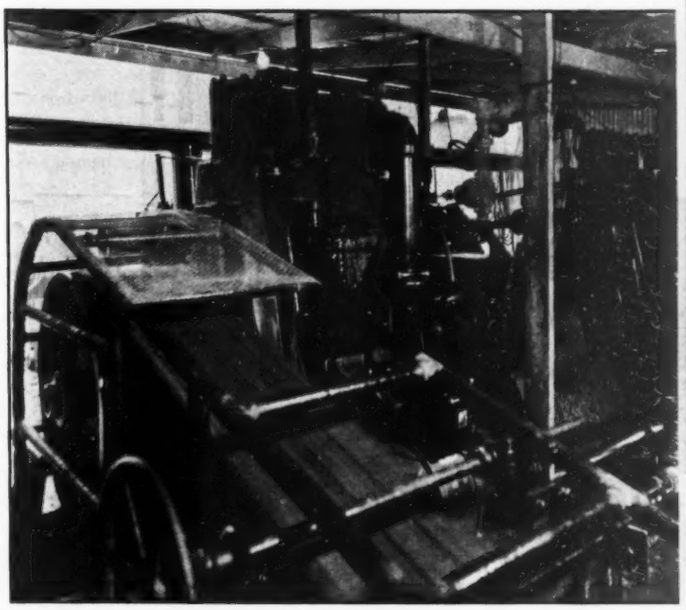
Pioneer With Rotary

This situation naturally focused attention on the rotary method of drilling and to the Potter Development Co. of Port Allegany, Pa., goes the distinction of owning and operating the first heavy-duty deep-well rotary drilling rig in the eastern fields. Much of the credit for this pioneering venture belongs to J. H. Isherwood, general manager, under whose direction the rig was installed and is now operating successfully at a depth of 7,910 feet.

Careful analysis of drilling conditions, rock strata, etc., indicated that there were no insurmountable factors which would prevent the successful use of the rotary rig in the east and that the problems involved were no more complicated or difficult of solving than those frequently encountered in the western fields. In other words, the tradition and precedent of years which had so firmly entrenched cable tools in the east was to make way for progress and improved methods of drilling deep wells in the eastern fields. Undoubtedly rotary drilling developments in the Illinois Basin had contributed their influence in the minds of those seeking improved and more economical methods of drilling deep test wells in eastern fields.

The company reached its decision after carefully studying and analyzing their particular problems. Such factors as caving formations and gas pockets, involving delays and expensive fishing jobs, presented operating problems for which a satisfactory solution has never been worked out with cable tools. A method, then, which would offer "control" where large gas pockets at high pressure have to be taken into account was one of the deciding points in the selection of the rotary. Further, the rotary system offers more satisfactory means of formation study, through the unbroken cores which are possible by use of rotary core barrels, as well as by the routine method of studying the drilling returns at the slush pit or shale shaker.

A pertinent economic factor is the high cost or added expense of carrying unproven acreage due to the long time element involved in completing deep test wells by cable tools. The rotary rig offered quick developments in proving acreage thus substantially reducing rental fees and other expense incidental to the long delays encountered before completing wells with cable tools. The "free time" clause allowing for the development of geological and geophysical information was not sufficient when drilling with cable tools. Frequently rentals came due before blocks of acreage had been tested or proven. Further it has been the practice with some gas companies to maintain a balance between their shallow and deep gas acreage. The drilling time required to drill deep test wells by cable tools has made it difficult to maintain this balance which made it necessary to expedite the drilling program on an economical basis by other methods.

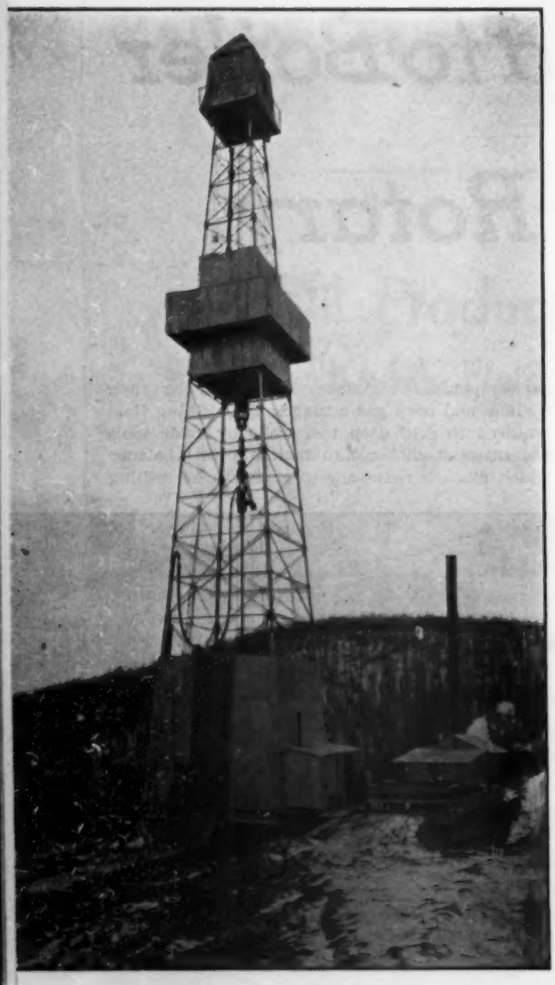


The prime mover for the rig consists of two portable vertical twin-cylinder steam engines. The engines drive the slush pump and rotary table independently while drilling, and are clutched together for hoisting

Concurrent with the comparison of mechanical features of the two types of rigs, information was being developed by the geological department in charge of Jack Gaddess checking local well logs with other similar logs in successful rotary territories in the West. It was found that there had been no structures encountered in drilling deep test wells in eastern territory where difficulties with cable tools had been so prevalent which would make the use of rock bits impractical. Furthermore sand pumping of cable tool wells showed that many of the formations were good mud makers and that a minimum quantity of mudding agents would have to be added.

Better control of drilling operations, the ability to obtain unbroken cores when desired, and the expectation of much faster drilling based on results obtained in equally difficult strata, more than justified the greater initial investment in a rotary rig. Compared with the one to two years' drilling time required with cable tools, it was reasonable

Portable superheated steam generator used on the deep test. This single 70-horsepower boiler with smokebox type superheater is furnishing all the steam for the rig



Potter Development Co.'s heavy-duty rotary rig drilling a deep test in Pennsylvania

to expect completion with a rotary rig in from two to three months or less time.

The Potter company, a pioneer in producing gas from the deeper gas sands of north central Pennsylvania, has drilled several deep test wells in western Pennsylvania to the deeper horizons. In all instances their experience was much the same, namely, difficult and expensive fishing jobs and extremely slow progress.

With the purchase of a rotary rig, their plan was to complete the deep test wells which were in progress but which were delayed by fishing jobs and caving. They wanted to test the practicability of rotary drilling in Pennsylvania under the worst possible conditions and for this purpose selected a well which had been drilled by cable tools to a depth of 6,085 feet located on a 30 degree slope in a rugged hilly country about 2½ miles east of Keating Summit near the southwest corner of Potter County.

This well had caused no end of trouble and numerous fishing jobs during drilling operations covering a period of 18 months. Numerous gas pockets were encountered which frequently lifted the tools causing fishing jobs for tools and wire lines. In two instances it was necessary to drill by the tools and start new holes which resulted in an extremely hazardous hole, because of by-passed tools and possible recurrence of difficulties from the embedded tools.

It was conceded that this hole would prove a severe test for the rotary. Results to date have been outstanding. Over 1,825 feet of hole have been drilled in less than a month with a single portable superheated steam generator with total heating surface of less than 700 square feet.

The rig selected may be described as an Oil-well steam-saving rotary drilling rig. Steam is supplied by a portable superheated steam generator, the latest and newest development in steam generating equipment in the oil fields. The steam generator is gas-fired and normally operates at from 400 to 500 per cent of its nominal rating of 70 horsepower at 350 pounds working pressure and from 150° to 250° F. of superheat.

The fact that the single steam generator is successfully supplying power to drill to this depth is creating much favorable comment in view of the substantially lowered initial investment and the high operating efficiency that is being maintained by the steam generator day after day. Contributing to the high efficiency of this generator is the fact that the heat of the flue gases ordinarily lost in the stack is being absorbed in part by the superheater coils which are placed in a housing attached to the smokebox end of the boiler.

Superheated steam does not condense until it has reached its saturation temperature. Therefore superheated steam prevents condensation and a corresponding pressure drop in steam lines not excessively long. Condensation on the cylinder walls is also prevented or reduced. Superheated steam delivers more power because its expansive force is greater for the reason that the steam must give up its superheat in the form of heat energy before it reaches its saturation temperature and condensation starts. All of these factors contribute to greater overall efficiency.

Exhaust steam from the engines is used at low pressure to heat the boiler feedwater and to provide an induced draft in the steam generator stack when operating at high ratings. The feedwater is heated in an open type feedwater heater. The cold feedwater is sprayed into a chamber where it is mixed with exhaust steam otherwise wasted and brought up to a temperature close to 210° F. before it is pumped into the boiler. This steam saving device saves heat and fuel as well as reduces the requirements of raw make-up water. The feedwater heater also precipitates impurities in the water which may be blown out of the boiler in the form of sludge, thus preventing the formation of excessive scale on the flues.

The feedwater heater is but a part of a complete assembly combining three boiler auxiliaries in one unit consisting of a cold water pump forcing raw feedwater into the heater chamber and the hot water pump delivering feedwater to the boiler.

The rig is powered with a portable double-engine drive consisting of two 7¾-inch by 7-inch vertical twin cylinder steam engines mounted on a structural base. When drilling, one engine operates the rotary table through a large hoist while the other engine V-belt drives the 7¼-inch by 18-inch power slush pump. A unique feature of the V-belt drive is that an idler is used to take up the slack in the V-belts avoiding the necessity of cutting away the floor for the V-belts and the skidding of the pump to take up the stretch in the belts.

The engines, which are clutched together for hoisting, are equipped with hand-controlled variable steam cut-offs making it possible to change the cut-off or admission of steam into the cylinders depending on load conditions. In other words, the expansive power of the steam is used rather than the pressure only.

A power slush-pump driven through V-belts by a variable cut-off engine requires from 30 to 40 pounds of water per hour per pump horsepower developed in contrast to 80 to 90 pounds of water for direct-acting steam slush pumps. Such savings and others aforementioned make possible the substantial reduction in the number of steam generating units required and corresponding savings in fuel.

Power is transmitted to the drawworks through two chain drives of different sprocket ratios. This provides two speed-ratios for the rotary drive. Two additional ratios are accounted for by two chain drives from the jack shaft to the drum shaft, making four hoisting speeds available. Bearings are of the antifriction type throughout and clutches are of conventional jaw construction. Bearings of shafting are carried on steel castings at both ends instead of on steel plates. The hoisting drum shaft is grooved to accommodate 1⅛-inch wire line and the drum brakes at either end are the water-cooled type. The hoist is equipped with standard and automatic catheads.

The 4¼-inch by 31-foot grief stem is rotated by a 27½-inch oilbath ball bearing rotary with spiral bevel cut-tooth driving gears and roller-drive bushing. The rig is equipped with a 200-ton capacity crown block, a 66-inch traveling block of the roller bearing type, a triplex 150-ton capacity hook and an oilbath 150-ton capacity swivel.

The machinery and equipment is well adapted for use in the mountains and hills of Pennsylvania due to its high degree of portability. It is only necessary to break the coupling on the intake and exhaust lines, remove the drives to the pump and hoist, take out the foundation bolts after which the machinery and steam generator may be winched on a truck for moving.

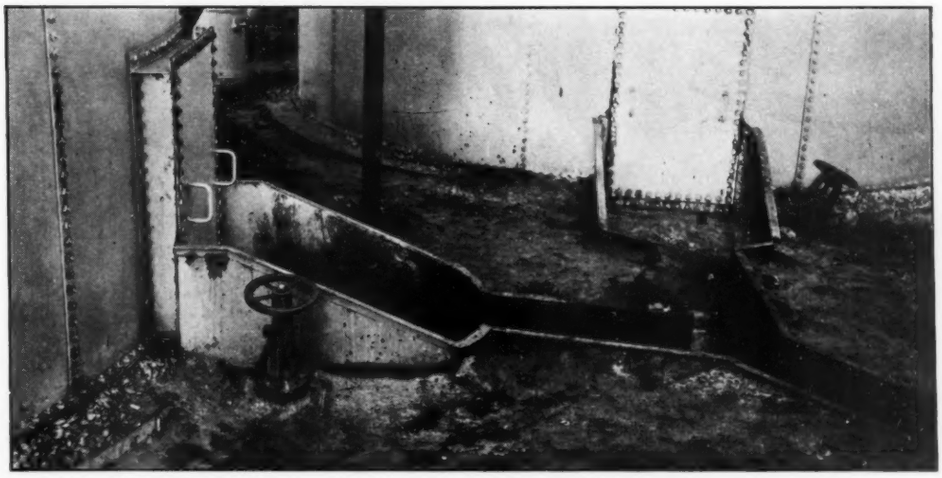
View of derrick floor at the Potter company's well, which is being drilled to a depth of 8,000 feet with a 27½-inch rotary

OPERATING IDEAS

Marker for High-Pressure Line

A major oil and gas company operating in the Rodessa area of Louisiana has adopted concrete markers for all their high-pressure lines. The markers are 6-inch by 6-inch concrete posts with the company's name imprinted on the post and also "field line" to designate it as being a high-pressure line. These markers are placed at all points where the lines cross roads and where the

lines enter other companys' property. The installation of the markers is very helpful in that they designate the location of the line and eliminate the danger of a ditching machine or excavating equipment accidentally cutting the line. They are especially helpful in farming sections where plowing soon covers all marks of the line.

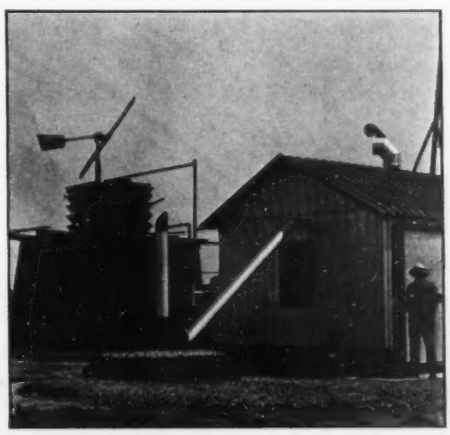


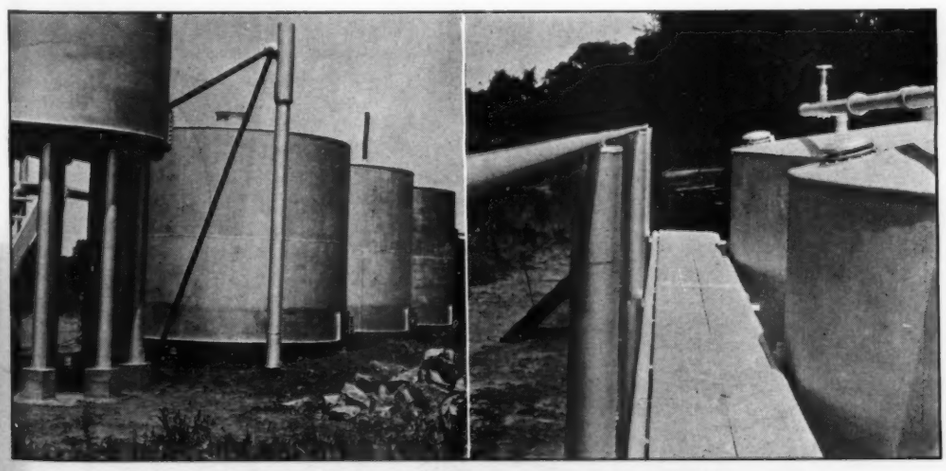
Troughs Facilitate Cleaning of Stock Tank

Wells in the Wilmington field of California commonly make about 3 per cent sand with the oil while they are flowing. Most of this is removed by sand traps, but there is usually considerable basic sediment in the stock tanks. This necessitates frequent tank cleaning. In order to make this somewhat unpleasant task more easily accomplished and to promote cleanliness about the tanks, Union Pacific Railroad Co. has equipped all of its batteries with sheet-metal troughs to conduct the waste material from the clean-out plates of the tanks to sumps located outside of the fire walls. At the point where the trough passes through the fire wall a concrete section is used in the wall. The trough is fitted with a gate at this point, and this is kept closed when the tanks are not being cleaned. The gate is raised and lowered by turning a hand wheel installed on top of the concrete section of the fire wall.

Windmill-Driven Generator

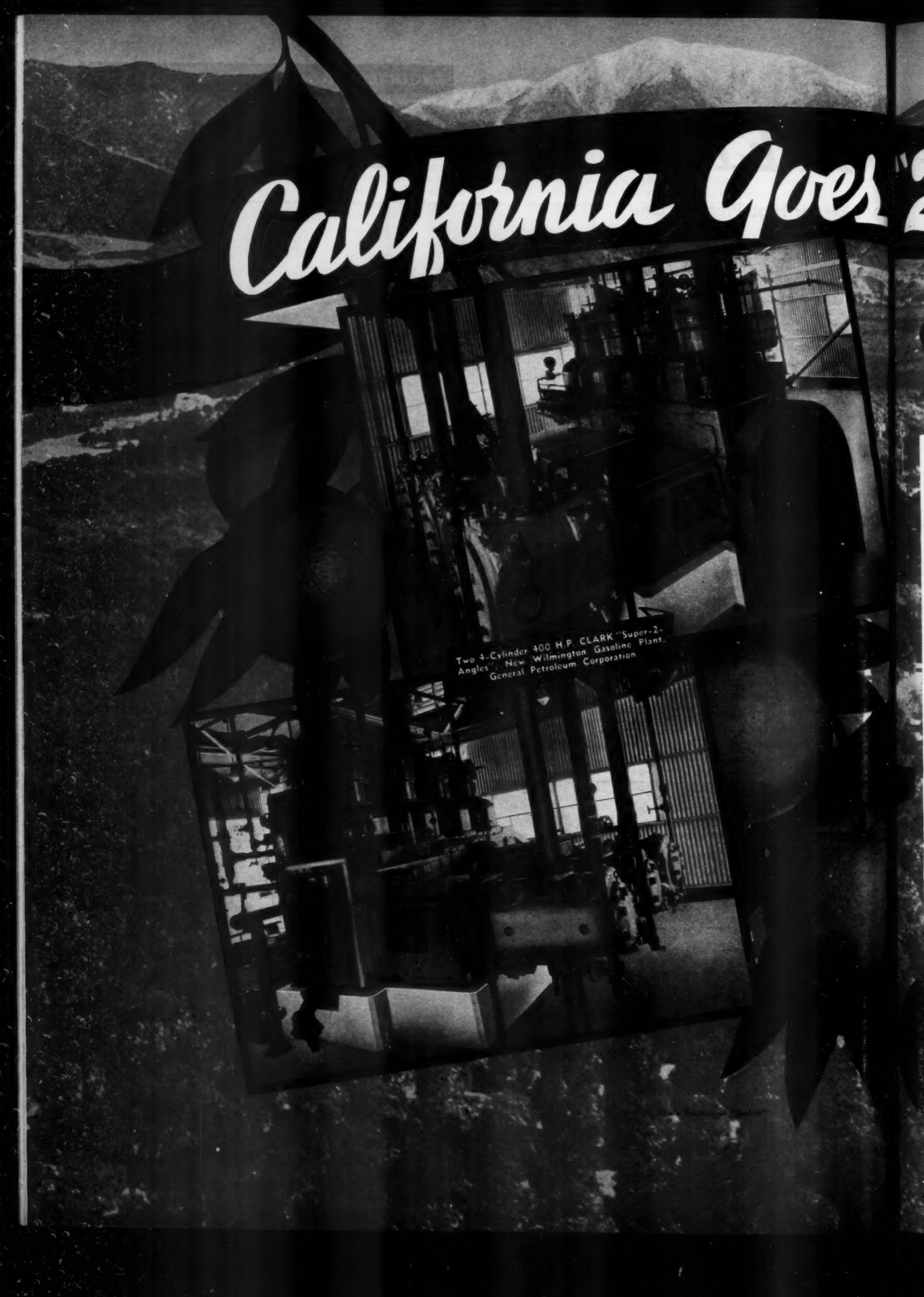
At an isolated pumping well in Kansas, the pumper uses a windmill to drive a generator for charging a battery furnishing current for electric lights and radio installed in the power. The pumper lives in a town several miles away and is at the lease every day even though the month's allowable production can be pumped in five days. It will be noticed that the exhaust of the engine is muffled by passing through an expansion chamber placed in a gravel bed retained within the concrete box shown here.





Old Pipe Used for Railings and Tank Supports

At a tank battery on a water-flood property in Oklahoma old pipe is used extensively for making rails on walk-ways as well as for foundations under the tanks. The gun barrel rests on welded supports consisting of cross pieces and uprights made from old pipe and set in concrete. The stock tanks rest on horizontal 6-inch nipples placed on concrete foundations which raise the tanks off the ground in order to reduce corrosion. The photograph on the right illustrates how the company uses old pipe for railings on walk-ways of its stock tanks.



Two 4-Cylinder 400 H.P. CLARK "Super-2-Angles", New Wilmington Gasoline Plant, General Petroleum Corporation

"2-Cycle-Angle"!

General Petroleum Installs CLARKS in Latest Plant at Wilmington

GENERAL PETROLEUM originally selected the two CLARK 4-cylinder, 400 H.P. 2-cycle-angle compressors shown on the opposite page; and subsequently ordered two more of these units for the extension of their new natural gasoline plant at Wilmington.

The CLARK "Super-2-Angle" is chalking up new records for economical installation and economical operation. These units are enjoying a sensational national success because they are equal to horizontal compressors in power and efficiency, yet accomplish 5 substantial savings, viz: (1) Shipped assembled, they cut transportation and erection costs; (2) They require much smaller foundations; (3) Require less floor space, smaller buildings; (4) They save fuel, due to CLARK Super-2-Cycle Fuel Injection; (5) They save on maintenance, due to extreme mechanical simplicity.

The 4-cylinder 400 H.P. size is the most economical size that can be installed, giving lowest dollar cost per 1,000 cubic feet of gas delivered. In economy this unit is not only superior to any other size, but to any other unit on the market.

We will gladly furnish the complete engineering facts and figures on the CLARK "Super-2-Angle", furnished in 2, 3, 4 and 6-Cylinder sizes, ranging from 200 to 600 H.P.

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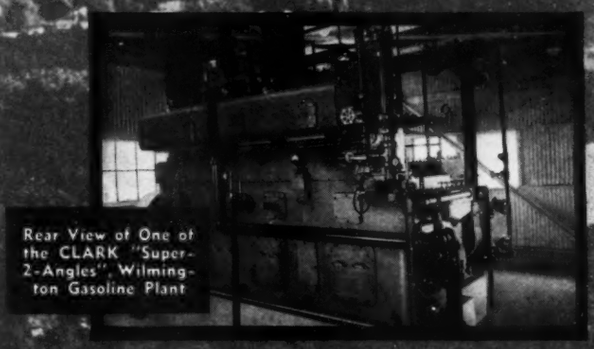
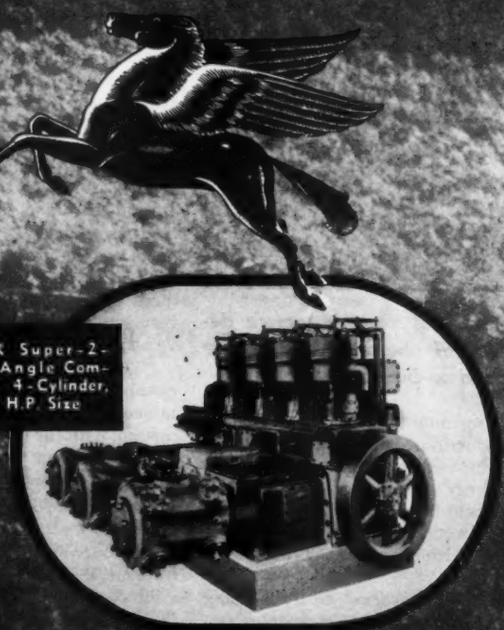
Export Office: 30 Rockefeller Plaza, New York. Midcontinent Sales Offices and Warehouses: Tulsa, Okla., Houston and Dallas, Texas. West Coast Office: Smith-Booth-Usher, 2001 Santa Fe Av., Los Angeles. Foreign Offices: 72 Turnmill St., E. C. 1, London, England; 4 Str., General Poetas, Bucharest, Roumania



Rear View of One of the CLARK "Super-2-Angles", Wilmington Gasoline Plant



CLARK Super-2-Cycle Angle Compressor, 4-Cylinder, 400 H.P. Size

CLARK

Results of Flooding Correlated With Laboratory Estimates

By A. J. SAXE and S. T. YUSTER
South Penn Oil Co. Bradford District Research Staff*

Ever since the inception of water-flooding as a secondary means of recovering oil from the Bradford sand on a profitable basis, the problem of spacing, pressures, and rate of production or depletion, has been one of continual experimentation in the field, resulting in the expenditure of huge sums of money by the producers. However, this problem cannot be said to be peculiar to the Bradford field. The most perplexing problems confronting the entire oil industry today, those of esti-

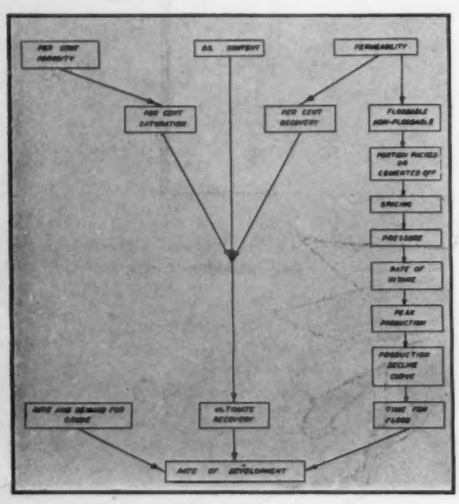


Fig. 1—Interrelation of various factors dependent on physical characteristics of the oil sand to be flooded

mating reserves, formulating true conservation laws, and the production of oil both by primary and secondary methods through maximum utilization of natural energy and energy introduced by external means, would be a simple task if it were possible to reduce the physical laws governing the flow of heterogeneous fluids through porous media to basic fundamentals.

That an honest and concerted effort is being made by private investigators, oil companies and various universities to discover and evaluate elementary quantities in order to set up proper equations describing the flow of mixtures of oil, gas and water through oil-bearing sands is evidenced by the volumes of literature published not only in the past few years but in the past few weeks. The bibliography on the subjects is becoming quite extensive. Excellent studies along these lines are being made, but these studies for the most part deal with unconsolidated sands or small-scale analogies, so that the conclusions are necessarily only of a comparative nature. It is necessary to correct these data with factual data of the field, but obtaining these data if not impractical is at best time-consuming.

With this constantly increasing background of mathematical analyses, laboratory experiments, and practical field application, we are gradually obtaining a clearer understanding of the complex relationship involved. The Bradford producer has gone far from the days of promiscuous dumping of water into old wells, assuming that the mechanics involved are relatively simple and that the movement of the water flood front proceeds uniformly a fractional part of a foot per day through the sand. But much remains to be explored. Although past history proves that what is abstract theory today, with few modifications, becomes the accepted practice of the future, the conscientious operator is apt to become too impatient with the theoretical aspects of a problem.

As a result of much of the work done here at State College in an effort to establish the relationship of the many variables involved in the process of flooding the Bradford sand, it is our purpose to correlate actual field data with a simple theoretical background for the solution of the problem of spacing, pressures, and the rate of input or the rate of production. It is to be emphasized at the outset that the data here presented are only an empirical derivation based on limited field observations. It is believed, however, that with a thorough knowledge of sand conditions the relations as found can be applied by the producer to plan a proposed development more intelligently, resulting in a saving in development costs.

We have said the mechanics of water-flooding are complex, so before proceeding with the discussion let us consider first the problem of the flow of simple fluids:

Example 1. Flow of Bradford crude through a 6-inch level line, 40 miles long, at a pressure of 600 pounds per square inch at the pump and a temperature of 60° F.

Authority	Delivery-Bbls./Hr.
A	450
B	485
C	510

Example 2. Flow of gas, specific gravity of 0.60, through an 8-inch level line 20 miles long, at an inlet pressure of 200 pounds per square inch, an outlet pressure of 25 pounds per square inch and a temperature of 60° F.

Authority	Delivery-Cu. Ft./Hr.
D	367,000
E	392,000
F	422,000

It is readily seen that even in the practical application of recognized formulas for the flow of fluids in a single phase, variations of 10 per cent to 15 per cent are possible in computing deliveries.

Figure 1 shows the interrelation of the various factors of our problems dependent on the physical characteristics of the sand. It is significant to note the importance of the permeability measurement, and yet until a few years ago all of the water flooding developments were carried on without this very important information. For a complete discussion of this one term and its complexity you are referred to the Producers Monthly for September, 1937.

The equation for the single phase conductivity of a five spot as derived by Muskat and modified to apply in field units is as follows:

$$Q = \frac{0.00154\, k\, h\, \triangle P}{n\,(\log_{10} D/r_w - 0.269)}$$

Q = Fluid intake-bbls./day
K = Permeability-millidarcys
h = Net sand thickness-feet
$\triangle P$ = Pressure drop across sand-lbs./sq. in.
n = Viscosity-centipoises
D = Distance intake to producer-feet
W = Distance intake to intake-$\sqrt{2}$ D-feet
r_w = Effective radius of intake well-feet

The equation expressed in simple language states

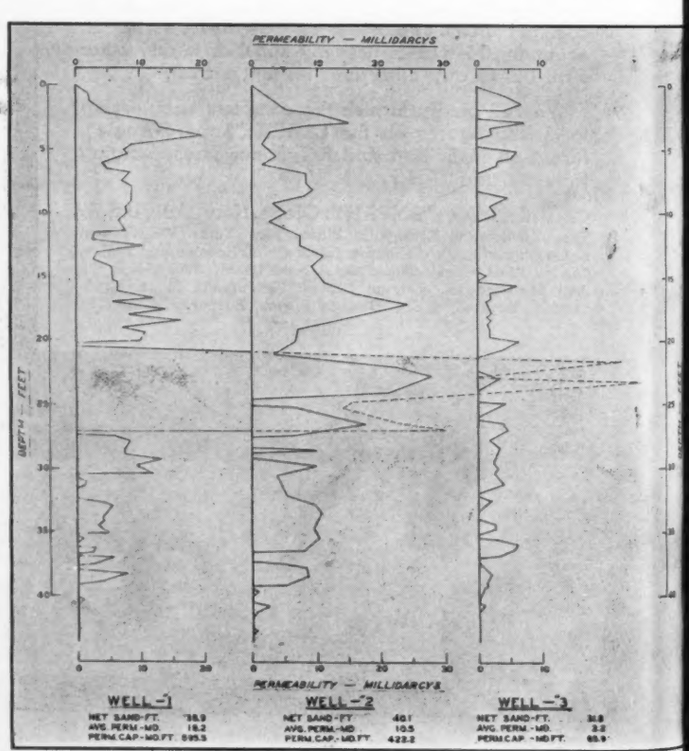


Fig. 2—Properties of sands in development A

*Presented at a symposium on "The Application of Research Results to Field Practices" at the Second Annual Technical Meeting of the Bradford District Research Group held at the School of Mineral Industries at the Pennsylvania State College, on October 15 and 16, 1937.

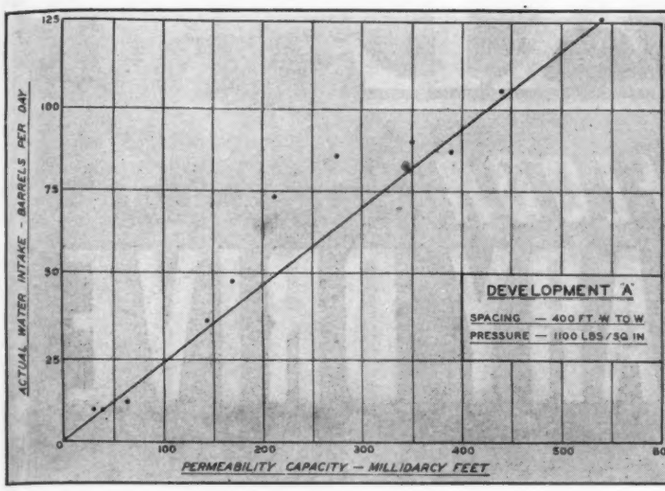

ACTUAL WATER INTAKE - BARRELS PER DAY
DEVELOPMENT A
SPACING — 400 FT. W TO W.
PRESSURE — 1100 LBS/SQ IN.
PERMEABILITY CAPACITY — MILLIDARCY FEET

Fig. 3—Results of plotting actual water intake against permeability capacity for development A

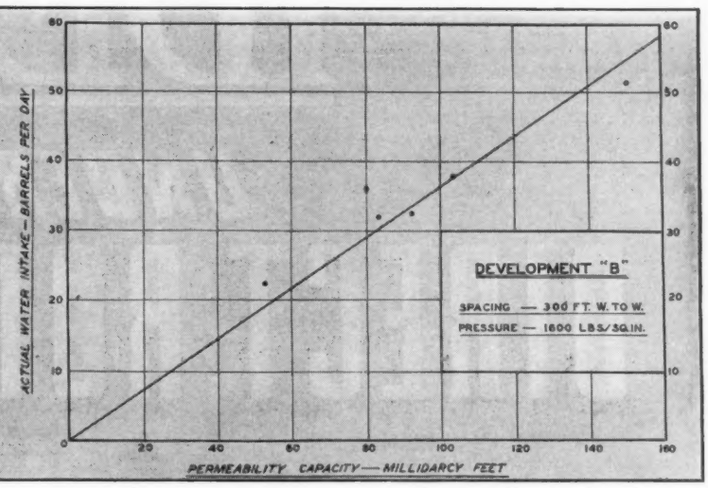

ACTUAL WATER INTAKE - BARRELS PER DAY
DEVELOPMENT "B"
SPACING — 300 FT. W. TO W.
PRESSURE — 1600 LBS./SQ.IN.
PERMEABILITY CAPACITY — MILLIDARCY FEET

Fig. 4—Results of plotting actual water intake against permeability capacity for development B

that the rate of input increases as the permeability, net sand thickness and pressure increases, and decreases as the viscosity and spacing increases. It can be seen that the use of any equation for the prediction of input and production rates involves the use of quantities which are almost impossible of evaluation. At best they must be based upon some approximations. Take k, for example. It is known that the air permeability of a dry core is greater than one which contains oil. The viscosity, n, is an unknown quantity as no work has been done on the viscosity of water, oil and gas mixtures. The radius of the intake well, r_w, is another factor to be considered, but since it affects Q logarithmically, the weight it will carry is somewhat less than the other quantities. It is to be noted that the rate of input may be varied between wide limits by a change in any one of the factors considered. So that it is readily seen that the application of any theoretical equation to field conditions must be made with extreme care as the evaluation of the variables involved may introduce enormous errors in the results.

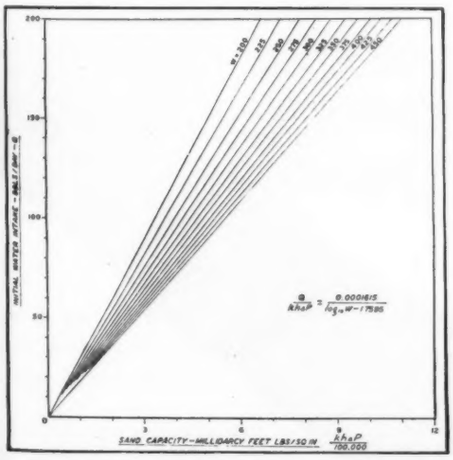


Fig. 5—Chart for determining input rate

Further examination of the equation (1) shows that if P, n, D, and r_w are kept constant, Q must vary with kh, so that if Q is plotted against kh, a straight line passing through the origin should result whose slope is Q/kh. This means that actual field intakes are necessary on a property with the same spacing and a constant pressure. Then if all intake wells are shot in the same manner, we will assume that r_w will remain the same and that on a particular property the viscosity, n, will be the same. It will also be necessary to have sufficient core data for the determination of k and h, or the permeability and net sand thickness. Two properties were selected, development A, with a spacing of 400 feet water to water, and a pressure of 1,100 pounds per square inch on the sand, and development B, with a spacing of 300 feet water to water and a pressure of 1,600 pounds per square inch on the sand. This gives a range covering the prevailing practice of spacing in the Bradford field.

TABLE 1—ANALYSES OF CORES FROM MID-CONTINENT

No.	Sand	Depth ft.	Sand ft.	Avg. perm. md.	Perm. cap. md./ft.	Applied press. lbs./sq. in.	Total press. lbs./sq. in.	Spacing w-w	Intake bbls./day reported	Est.*
1	Bartlesville	380	47	18	846	400	570	440	...	...
2	Bartlesville	364	28	12	336	400	560	440	...	...
3	Bartlesville	372	40	26	1,040	400	570	440	...	...
4	Bartlesville	446	30	2	60	400	600	440	...	...
5	Bartlesville	392	20	1	20	400	570	440	...	...
6	Bartlesville	350	34	24	816	400	550	440	...	...
1-6	Average	384	33	16	519	400	565	440	40-50	50
7	Bartlesville	471	33	20	660	450	650	440 }		80
8	Bartlesville	480	37	8	296	450	660	440 }	35-70	35
23	Bartlesville	1,969	63	48	3,024	...	860	660	300-500	†400
X	Bartlesville	550	32-36	50	1,700	350	600	440	160-180	180

*Estimated from Nomograph.
†Extrapolated from Nomograph.

In Figure 3 the results of plotting Q against kh are shown for development A. The permeability used is the dry or air permeability as determined in routine core analysis. The permeability capacity is the area under the resulting permeability profile, and the intakes are actual water intakes as recorded by the meter reader in the ordinary course of lease operation. The intakes given by the two points which are badly out of line on Figure 3, were checked after the graph was plotted and the recorded values found to be in error. Because of deficient meters, the meter reader had estimated the intakes, but upon correction, the points were much closer to the straight line. The intake is what we shall choose to call the initial settled intake. During the first few weeks the water intake varies considerably, but finally settles down, and from this point on has a gradual decline during the life of the flood, sometimes reaching 50 per cent of the initial at the end of 24 to 30 months, the principal factor being the degree of water correction. Figure 4 shows the results of plotting the same data for development B.

It is remarkable that there should be such close agreement between theory and actual field performance, when one considers the wide variations possible.

Equation (1) may be rewritten,

$$Q = \frac{0.00154/n \; k \; h \; \triangle P}{\log_{10} D - (\log_{10} r_w + 0.269)} \qquad (2)$$

or,

$$Q = \frac{A \; k \; h \; \triangle P}{\log_{10} D - B} \qquad (3)$$

Where

$$A = \frac{0.00154}{n} \qquad (4)$$

and

$$B = \log_{10} r_w + 0.269 \qquad (5)$$

Since we now have two lines on Figures 3 and 4, each representing a different set of variables (Q, kh, $\triangle$P, D), it should be possible to substitute these two sets of data in equation (3) and obtain two equations with A and B as the only unknowns. Solving these two equations simultaneously gives A = 0.0001615 and B = 1.609. Substituting these values of A and B in equation (3) it becomes

$$Q = \frac{0.0001615 \quad \text{x kh } \triangle P}{\log_{10} D - 1.609} \qquad (6)$$

In this equation it can be seen that for any constant value of D, Q is a linear function of kh $\triangle$P and the line passes through the origin. The slope of the line is given by the coefficient kh $\triangle$P, which we shall call the sand capacity. In Figure 5 are plotted a series of Q vs-kh $\triangle$P lines using different values of W, the water to water spacing which is equal to $\sqrt{2}$ D. By choosing the proper W line and knowing the sand capacity from a core analysis, the input rate can be determined. Figure 6 is a nomograph which will serve the same purpose as Figure 5. It is to be noted that the initial water intake and permeability capacity lines on the nomo-

(Continued on Page 82)

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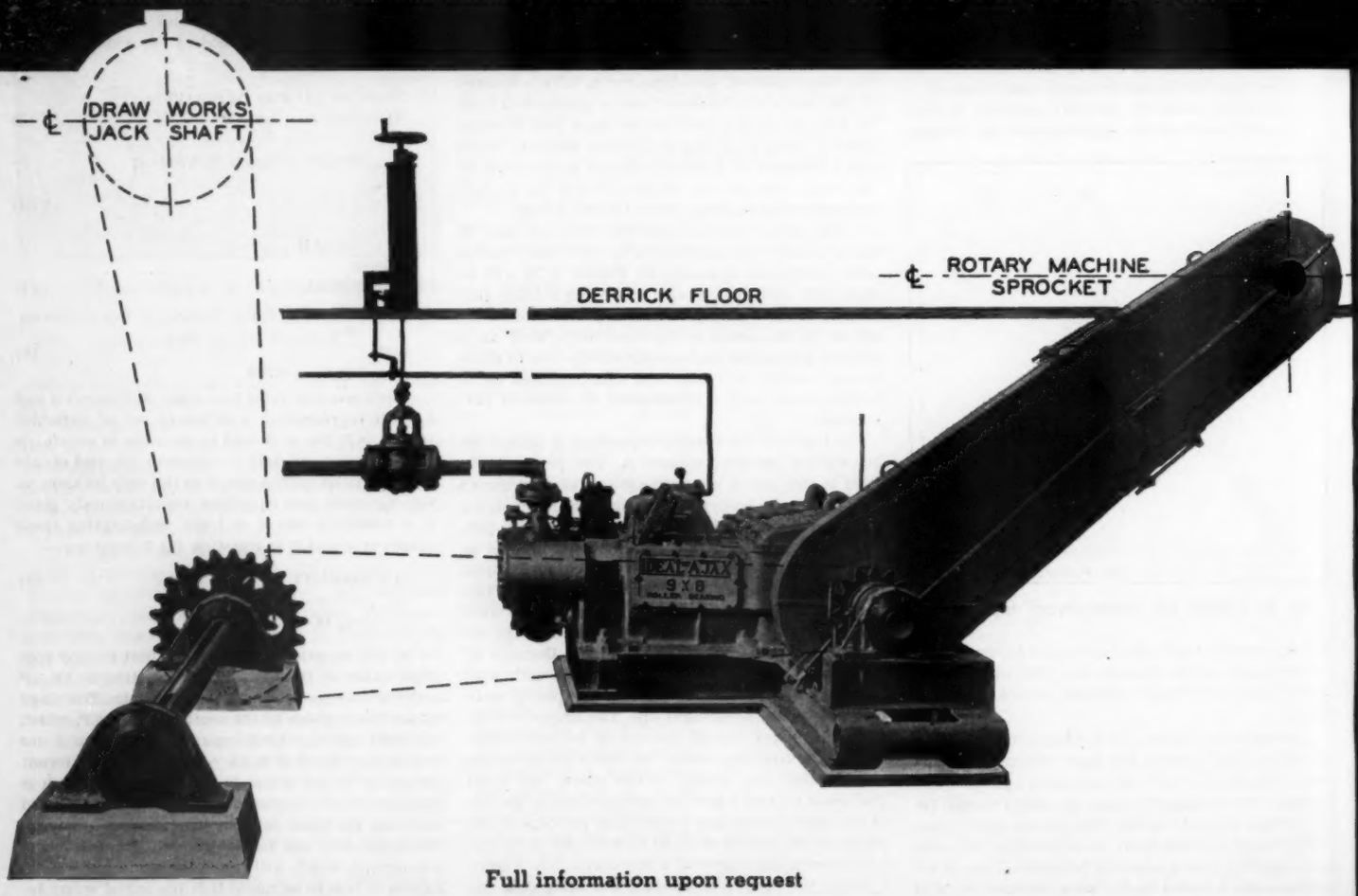

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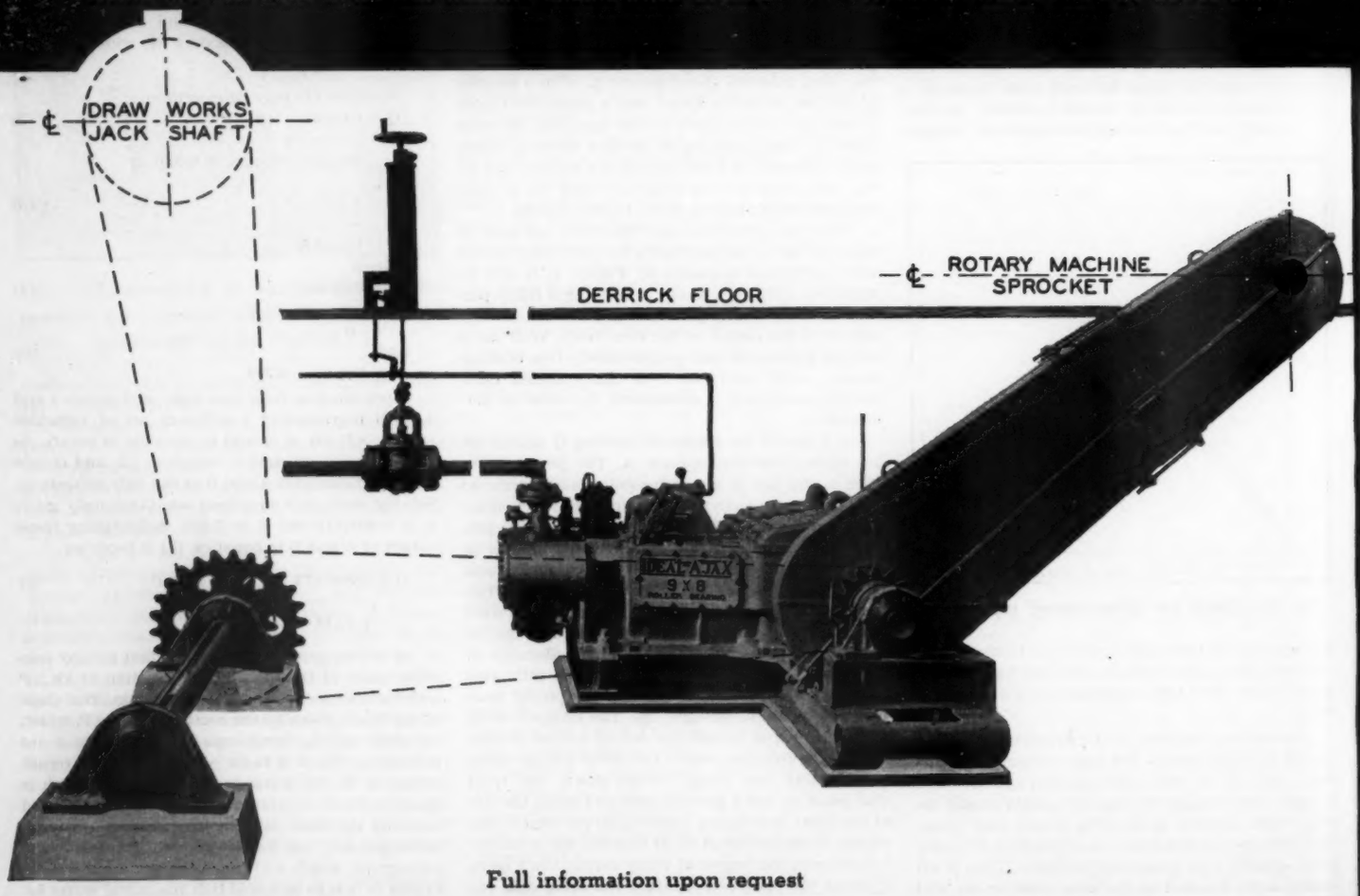

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ENGINEERING and OPERATING SECTION

graph may be multiplied by the same factor in order to vary the range without destroying the validity of the calculations.

Our discussion has been based on results in the Bradford field. The accompanying Table 1 shows the results of some cores from the Mid-Continent taken from "Water-flooding in the Mid-Continent" by G. H. Fancher and H. B. Barnes, which appeared in the Proceedings of the A.I.M.E. dated October 11, 1935. Although the data are very meager, the

not result in a decrease in oil recovery per acre foot of oil-bearing sand, but showed a considerable saving in development cost.

It might be of interest to consider the significance of the magnitude of A and B which was determined when the two equations were solved simultaneously. If the values of A and B are substituted respectively in equations (4) and (5) it is possible to solve for n and r_w. The value of n is 9.7 centipoises which is obviously just a mathematical statement as the fluids flowing are oil, gas, and water, and the highest viscosity of any of these is about 3. Of course, it is possible to make an emulsion of them with a very high viscosity but such is not the case. If the fundamental conductivity equation is reexamined it will be seen that the kh which was used was that of the dry air permeability. In reality the factor kh/n should be the one to consider since we do not know either the numerator or denominator of the fraction but the ratio. The ratio is equal to the permeability capacity based upon the dry air values divided by 9.7.

manner which extends the practical value of the work to almost everyone interested in understanding and improving the art of oil and gas production. By using reservoir information which can be disclosed by complete core analysis, means are shown for improving and studying well operation.

The author, M. Muskat, and R. D. Wyckoff, who contributed Chapter 1, have succeeded in presenting a treatise of unquestionable scientific value as evidenced by its inclusion in "The International Series in Physics." They have likewise succeeded in giving the oil industry its first acceptable book on underground flow of oil, gas and water.

Educational value and extreme clarity throughout the book is insured by using the effective style of presentation which is in current use in making reports of industrial research carried on by private companies. Each problem is completely discussed: (1) in background and principle; (2) in summary of results and significance; (3) in illustrated field and laboratory tests; (4) in analytical mathematical treatment.

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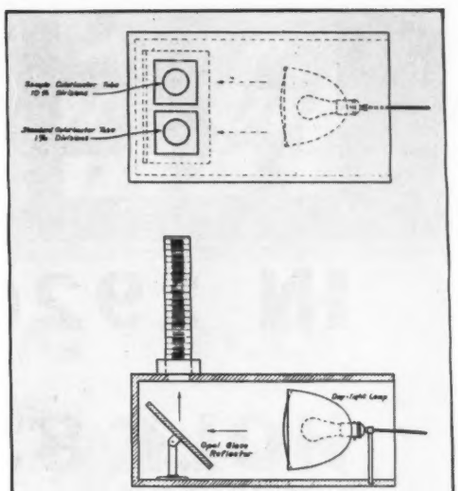
ENGINEERING and OPERATING SECTION

Measuring Sludging Characteristics of Lubricating Oils



By W. F. WEILAND

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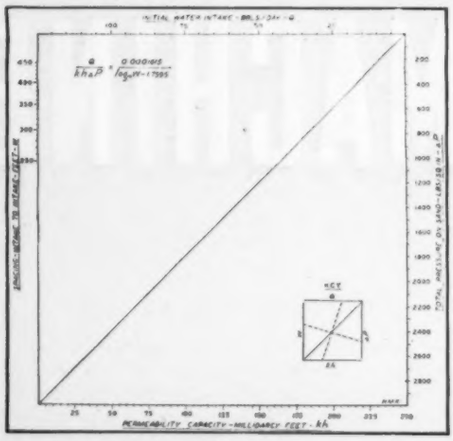

Fig. 6—Monograph for determining the initial water input

intakes as estimated by using the nomograph are in close agreement with actual results as reported.

With the data obtained from a core analysis and the use of Figures 5 or 6, it is possible to estimate the rate of water intake with a reasonable degree of accuracy. But is it not the purpose of the paper to offer a solution of the spacing problem by merely solving a simple formula.

In the Bradford field, where it is possible to determine the amount of oil in the sand reservoir underlying a property, it is apparent that beyond a certain point, drilling a greater number of wells will not necessarily result in a corresponding increase in profits. The question of spacing, therefore, is purely one of economics and the term "recovery" becomes one of various interpretations. A well spacing program fitting the requirements of a small operator would not be approved by a larger operator. For example, the former might prefer to drill more wells to recover 50 per cent of the flood oil in two years, than to recover 60 per cent in four years with fewer wells.

Figure 7 shows the effect of spacing on the per acre development cost. The governing factor then reduces to one of the rate of production or the rate of depletion, which in turn is governed by the rate of intake. The data thus far derived show that the rate of intake changes very slowly with the spacing. To illustrate, let us assume that the property under consideration has 30 feet of net sand with an average permeability of 5.0 millidarcys or a permeability capacity of 150 millidarcys feet. The intake using a spacing of 350 feet water to water and a pressure of 1,500 pounds per square inch would be 47 bbls. per day as determined by using the nomograph. Using a 400-foot spacing and the same pressure the intake would be 42 bbls. per day resulting in a saving of 20 per cent in development costs and prolonging the period of depletion 6 per cent; or the same rate of intake of 47 bbls. per day can be maintained by increasing the pressure to 1,625 pounds per square inch with the same saving in development cost.

All of the foregoing points to the use of wider spacing and higher pressures. This is in agreement with the conclusions of Dr. Fettke, who found after studying past production records of a number of projects, that the wider spacing of intake wells did not result in a decrease in oil recovery per acre foot of oil-bearing sand, but showed a considerable saving in development cost.

It might be of interest to consider the significance of the magnitude of A and B which was determined when the two equations were solved simultaneously. If the values of A and B are substituted respectively in equations (4) and (5) it is possible to solve for n and r_w. The value of n is 9.7 centipoises which is obviously just a mathematical statement as the fluids flowing are oil, gas, and water, and the highest viscosity of any of these is about 3. Of course, it is possible to make an emulsion of them with a very high viscosity but such is not the case. If the fundamental conductivity equation is reexamined it will be seen that the kh which was used was that of the dry air permeability. In reality the factor kh/n should be the one to consider since we do not know either the numerator or denominator of the fraction but the ratio. The ratio is equal to the permeability capacity based upon the dry air values divided by 9.7.

On solving equation (5) for r_w we obtain a value of 22.4 feet. At first glance this seems enormous and definitely in error but it must be remembered that this is an effective radius caused by radiating fissures and not the actual size of the hole. Calculations based on entirely different data and by another method gave the effective radius of another shot well as 26.9 feet. This is excellent agreement for field data. There is evidence other than mathematical for the magnitude of this factor.

In conclusion it is felt that a word of caution should be given. Although the data here presented should provide some aid to the producer in planning a development, extreme care should be exercised in their application, and only with a thorough knowledge of sand conditions. It should be remembered that the data from properties which were not in a steady state has been substituted in an equation which only holds under such a condition. The purpose of these calculations is, however, primarily to assist in predicting approximately the water needs for a property.

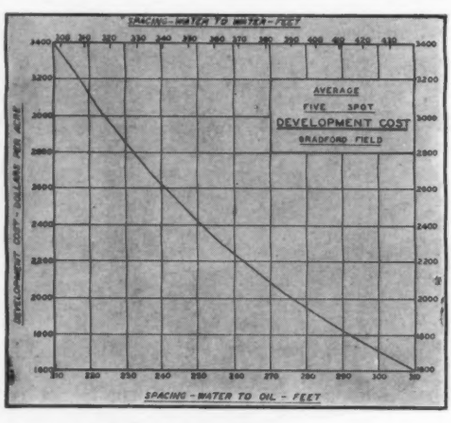

Fig. 7—Effect of spacing on the per acre development cost

The authors wish to acknowledge with thanks the kindness of Dr. H. M. Krutter in designing the nomographs used in this paper, and the Olean Petroleum Co. and the Tide Water Associated Oil Co. for some of the data used in the analysis.

"Flow of Homogeneous Fluids Through Porous Media"

(Reviewed by W. L. Horner, Core Laboratories, Inc., Dallas, Tex.)

The digested results of six years of a competent, directed investigation by a leading oil production organization are presented in a skillfully edited manner which extends the practical value of the work to almost everyone interested in understanding and improving the art of oil and gas production. By using reservoir information which can be disclosed by complete core analysis, means are shown for improving and studying well operation.

The author, M. Muskat, and R. D. Wyckoff, who contributed Chapter 1, have succeeded in presenting a treatise of unquestionable scientific value as evidenced by its inclusion in "The International Series in Physics." They have likewise succeeded in giving the oil industry its first acceptable book on underground flow of oil, gas and water.

Educational value and extreme clarity throughout the book is insured by using the effective style of presentation which is in current use in making reports of industrial research carried on by private companies. Each problem is completely discussed: (1) in background and principle; (2) in summary of results and significance; (3) in illustrated field and laboratory tests; (4) in analytical mathematical treatment.

Engineers who have been following the literature of subsurface flow will find generous treatment of practically all of the references in addition to much work of the Gulf Research & Development Co. which has been hitherto unpublished.

The text falls into four natural subdivisions.

Foundations. Geological considerations discussed include complete treatment with mature knowledge of the nature of oil, gas and water reservoirs and their alteration with geological time, compaction and the occurrence and migration of connate waters, oil and gas. Laboratory methods for the measurement of permeability and porosity are completely reviewed. The unit of measure, named the Darcy, originally, by Wyckoff and Muskat, is defined. Heat conduction, electrostatics and current conduction are compared with hydrodynamics in porous media and the classical hydrodynamic literature are clearly reviewed.

Steady State Flow of Liquids. The author suggests an alternative heading for this section, "Exercises in Potential Theory,' yet apart from the physical and mathematical values of the material, the diagrams, models and discussions treat a large number of practical engineering problems and include among others: (a) Dam seepage and pressures; (b) production capacities of wells which expose only a portion of the available reservoir section; (c) seepage of water from canals and ditches; (d) production from limestone wells, acid treatment, fractured formations; (e) effect of a sanded liner on production rate; (f) gravity drainage into wells; (g) water coning and the effect of shale "breaks"; (h) effects of producing wells in groups; (i) methods of spacing locations to control drainage across lease boundaries; (j) waterflooding efficiencies of various spacing patterns.

Nonsteady-State Flow of Liquids. A partial list of problems treated are: (a) Production decline and pressure changes in water drive fields. Fundamental discussion of the problem of the East Texas field and its complete study. (b) Decreased well loss effects. (c) Interference between producing wells. (d) Methods for practical study of spacing problems by means of models.

Flow of Gases Through Porous Media. A partial list of problems treated here are: (a) Effect of gravity. (b) Water coning in gas wells. (c) Gas oil ratios and gas coning into oil wells. (d) Pressure changes and productivities of types of gas fields.

"Flow of Homogenous Fluids Through Porous Media" may be purchased through the Book Department of The Oil and Gas Journal at the regular retail price of $8, express prepaid, and a copy will be forwarded promptly upon receipt of check or money order for that sum. Where no payment or purchase order is enclosed the book will be sent express c.o.d. to avoid delay.

Measuring Sludging Characteristics of Lubricating Oils

By W. F. WEILAND
University of Nebraska

It is fully appreciated that oil entering the combustion chamber of an internal combustion engine is subjected to severe conditions of heat and oxidation. We need not be particularly concerned in this discussion with oil excesses piling up on the piston head and other points in the combustion chamber, as these will either vaporize and pass out the exhaust in some form or other, or they may merely be deposited in place as soft carbon or tarry material. That part of the oil, however, which clings to the cylinder walls and which eventually finds its way back to the crankcase and bearings will be contaminated, among other things, with partially oxidized oil. This may lead to an endless source of annoyance and actual damage to rubbing surfaces.

The lubricating oil adhering to the walls may be divided into four parts, classified according to oil reactions on the walls, namely: (a) light portions that will vaporize readily and burn, passing out the exhaust as carbon monoxide and water vapor; (b) a somewhat heavier portion that merely vaporizes and passes out the exhaust as oil vapor; (c) another portion that partially oxidizes, leading to the formation of tars, gums, and eventually sludge. This is the principal source of oil contamination. Finally, part (d) is a heat-resisting portion that remains unchanged and upon which we must depend for lubrication.

A high-grade internal combustion engine oil will be essentially lacking in the first two portions. Commercial lubricants contain varying amounts of oils (c) and (d). It is generally conceded that the unsaturated hydrocarbons belong to class (c), though some lighter saturated hydrocarbons may also fall in this group. Class (d) will include primarily the saturated or paraffin base hydrocarbons because of their greater stability when subjected to heat.

The tars and partially oxidized portions will finally become thickened through further oxidation to gums, etc., and these find their way to bearing surfaces, where they will clog the metal pores and capillaries, and thereby hinder a proper coating of the bearing surfaces with good lubricating oil. The gums actually displace lubricating oil by replacement adsorption and when once deposited on the metal are very difficult to remove. The deposit grows by continuous accumulation except in so far as excesses will be rubbed off by frictional forces. The ensuing difficulties need not be considered in this discussion.

Many tests have been devised in an attempt to arrive at some figure which will be a measure of the oxidation characteristics of oil. Many of these tests are open to objections due to complications, and therefore attending difficulties which give rise to erratic results. With simplicity of apparatus and simplicity of operation foremost in mind, the equipment and procedure described here is the outcome of many trials which it is felt have been well repaid by remarkably consistent results.

Briefly, the test in its present form consists in heating a sample of the oil at a specified temperature, for a specified time, while air is caused to bubble through the oil. The sample will darken due to oxidation. The relative change in color density as compared to the original oil is taken as the oxidation number.

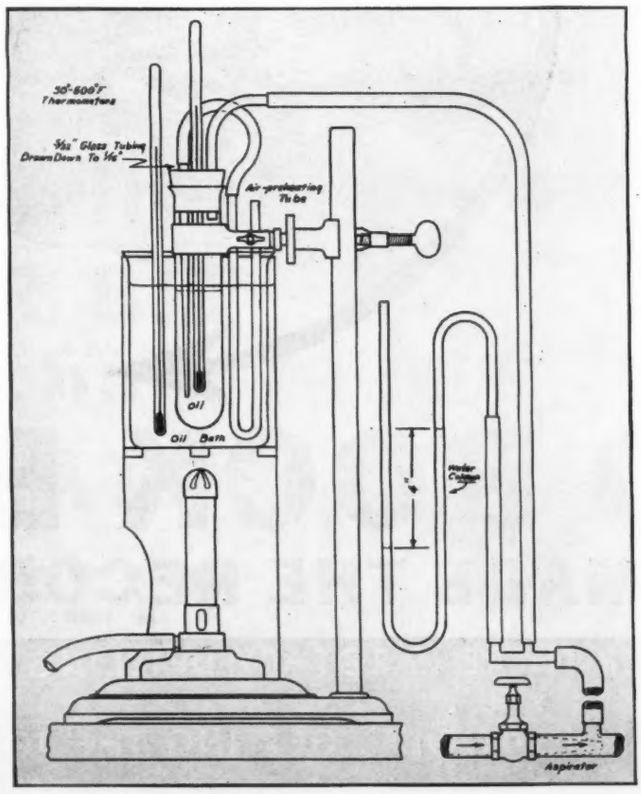

Fig. 1—Oxidation apparatus used in tests

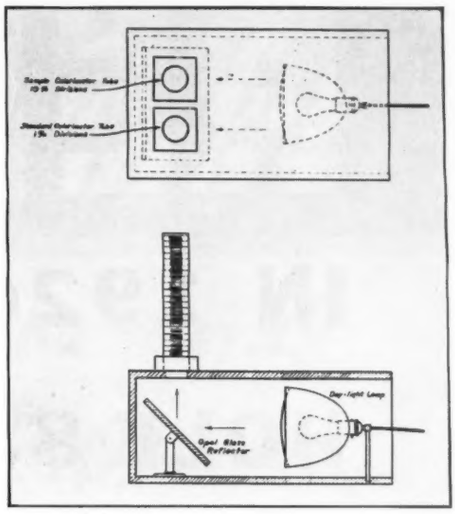

Fig. 2—Comparison apparatus

The oxidation apparatus as shown in Figure 1 has some features used by other experimenters, and in this respect nothing particularly new is claimed. However, the procedure, we believe, is distinctive. The aim of most tests under consideration today, including the one described here, is to approximate engine conditions to a greater or less degree and simultaneously provide a convenient laboratory method of analysis. It is to be expected that some modification of apparatus and laboratory technique will follow a truer interpretation of these results and their correlation with actual engine tests.

The apparatus includes the following items:

1. An oil bath (any high flashpoint, medium weight oil) of about one-half liter capacity per oil sample.

2. A jacket to protect the bunsen flame (or other convenient means for heating) and the oil bath from air currents.

3. Some convenient means for stirring the bath, especially when the apparatus is built in multiple.

4. A 500° or 600° F. thermometer for the oil bath. This thermometer shall be suspended in a vertical position in the oil bath and shall be about 1 inch from the test tube of item 5. The lower end of the thermometer bulb shall be on the same level as the lower end of the test tube.

5. A 1-inch diameter test tube of about 75-cc. capacity is clamped in a vertical position in the center of the oil bath. The lower end of the test tube shall be at least one-half inch from the bottom of the oil bath. The oil bath level should be approximately 1 inch above the oil sample level in the test tube.

6. A three-hole snugly fitting cork stopper for the test tube.

7. A 500° or 600° F. thermometer is inserted through one hole of the cork stopper for oil sample temperature. The lower end of the bulb shall be 1 inch from the bottom of the test tube and shall not touch the test tube at any point.

8. In the second hole of the stopper, insert a glass air tube to within one-half inch of the bottom of the test tube. The air tube is a long taper tube, the outlet at the bottom being one-sixteenth

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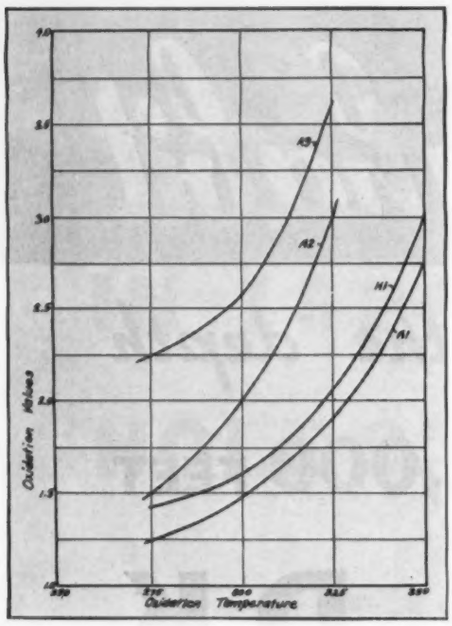

Fig. 3—Relation between oxidation number and oxidation temperature

inch inside diameter. The upper end of the air tube is connected to a U-tube which dips into the oil bath. Air passing through the U-tube is preheated and serves to maintain a more uniform oil sample temperature as well as a smaller temperature differential between oil sample and oil bath.

9. In the third hole of the stopper insert a short glass tube which is connected to an aspirator, or other air suction device.

10. A manometer in the aspirator line will serve to indicate suction in this line in inches of water.

The test is conducted as follows: Heat the oil bath to a temperature of about 310° F. and adjust the bunsen flame to maintain this temperature. For the apparatus in its present form a bath temperature of about 310° F. is required to maintain the correct oil sample temperature in the test tube. Twenty-five cubic centimeters of oil to be tested are put into the test tube. When the temperature of the oil sample has reached about 304° F. start the aspirator, which will draw air through the oil by way of the air tube and preheating U-tube, and cause the oil sample temperature to drop to 300° F. The suction in the aspirator line is adjusted to 4 inches water. The air is bubbled through the oil exactly *five minutes*. During this time the oil sample temperature shall not vary over ±2° from 300° F. Should there be a greater variation, the oil-bath temperature may be adjusted accordingly and oxidation repeated on a new sample. Remove the test tube with its contents and allow to cool in any convenient manner.

The colorimeter comparison apparatus is shown in Figure 2. It consists of a lamp house with a suitable source of diffused light from a 100-watt bulb. The light is reflected by an opal glass through two three-quarter inch holes spaced about 2½ inches. Two flat-bottom colorimeter tubes, free from disturbing rings, are placed over these holes. Fill one of these tubes to a depth of 1 inch with oxidized oil. Now pour from the original oil into the other colorimeter measuring tube until the two oil columns show the same color density as observed by looking down through the two columns simultaneously. The ratio of the height in inches of the column of original oil to the height of the column of oxidized oil is the *oxidation* or sludging *number*.

An elaborate colorimeter comparison apparatus, though convenient, is not required. The normal eye is very sensitive to slight color density differences; in fact, the change in density produced by a single drop of oil will often be observed, which is considered within the limits of experimental error. Inexperienced observers generally check within two or three drops. However, to eliminate the human element as far as possible, some form of photoelectric comparison is under consideration at the present time.

Numerous tests on many oils indicate that these oxidation numbers are very closely related to the unsaturated hydrocarbon content of the oils. This is evident from Table 1. Letters indicate the brand of oil, and numbers indicate the S.A.E. viscosity classification.

Two important variables, namely, temperature and the duration of the oxidation period, were considered in efforts to establish a convenient and satisfactory method of procedure.

A series of tests were conducted at temperatures ranging from 250° F. to 350° F. Most oils tested show very little change at 250° F. while at the higher temperature oxidation may be excessive. Furthermore, the behavior of some oils at the higher temperatures seems to be somewhat erratic. In general, the oxidation number appears to be an exponential function of the temperature as shown in Figure 3. The most logical and consistent results obtained to date have been at 300° F. When jacket temperature, flash-point of oil, probable average cylinder-wall oil conditions, and general behavior of the oil in an engine and crankcase are all considered, an oxidation temperature of 300° F. is within reason, except, of course, for oil excesses which enter the combustion chamber. In fact, the first tests run on this apparatus in its crudest form were made at 300° F.

TABLE 1—RELATION OF OXIDATION NUMBER TO UNSATURATED HYDROCARBON CONTENT

Oil—	Weiland oxidation number	Sulfuric acid test
A-10W	2.5	14%
A-30	1.5	8%
A-40	1.2	4%
A-60	1.72	10%
B-30	2.0	12%
C-30	1.5	8%
F-30	1.4	6%
F-10	1.45	7%
G-30	1.25	5%
Q-10	1.22	4%

The second variable—duration of oxidation period—does not lend itself so readily to logical deduction. Figure 4 will illustrate this point. Oxidation proceeds rather rapidly during the first five minutes when the change either becomes stationary for a period or else a point of inflection in the oxidation number—oxidation time curve is soon reached. For the majority of S.A.E. 30 oils tested, the inflection occurs near 10 minutes oxidation time. Extending the oxidation period to 30 minutes, and in some instances not shown on the curves, to 60 minutes, merely adds confusion to the picture at least in so far as the oxidation numbers are concerned. Then, too, it still remains an open question just how far oxidation should be allowed to proceed in an engine before an oil change is made.

The base, the blends, and the refining process all appear to have a profound influence on the general shape and position of the oxidation curve.

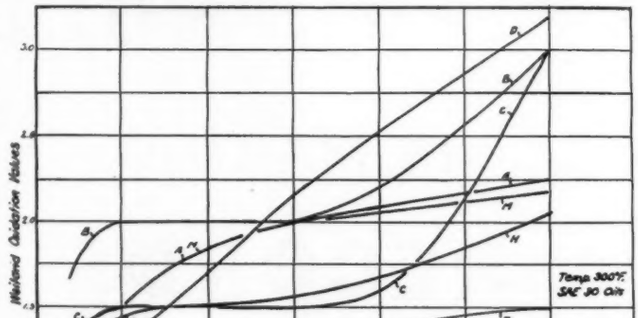

Fig. 4—Oil oxidation as related to time

Tests on several brands of oils ranging from S.A.E. 10W to S.A.E. 60 have added much weight to this statement. More definite information on the history of the oils, beginning with the crudes and ending with the finished product, will be needed before a definite relation can be established between these factors and the oxidation number.

It will be observed, however, in Figure 4 that three general types of oxidation curves are apparent, namely:

1. Those with medium and higher oxidation numbers (five-minute oxidation) showing generally a relatively stable condition for a period, and then rise upward rapidly, as B, C, H, and D.

2. Those with medium oxidation numbers which slowly tend to become relatively stable, as A and M.

3. Those with very low oxidation numbers which become stable at low oxidation numbers.

The first group includes fatty oil blends, the second group includes mixed base oils, and the third group the paraffin base and solvent extraction oils.

The selection of an oxidation period of five minutes duration was, therefore, largely arbitrary. Two points have strengthened this choice; namely, a sulfuric acid test mentioned above, and second,

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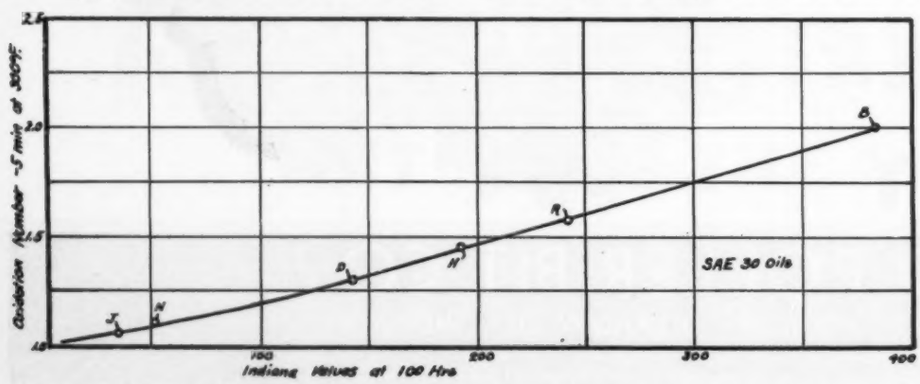


Fig. 5—Weiland oxidation number as related to the Indiana value

Buffalo Refinery Uses Unusual Insulation on Vacuum Tower

By H. STANLEY NORMAN

Capacity and range of products have been materially extended at Socony-Vacuum Oil Co. Buffalo, N. Y., refinery by addition of a large vacuum column or secondary stage to the former atmospheric fractionator at its Buffalo plant. The vacuum fractionator column and complimentary equipment was placed in operation last month and so far has more than equalled the results specified in design. E. B. Badger & Sons Co. was the contracting firm. One of the features of the new equipment is the first large scale refinery application of sheet aluminum insulation which was applied to the towers in the general improvement work by Alfol Insulation Co.

Addition of the new vacuum column will permit processing of 8,500 to 9,500 bbls. of crude per day. Increased demand in the area served by the Buffalo refinery and the desire to process a wider range of products were factors influencing Socony-Vacuum to undertake the expansion work at the present time. By addition of the new equipment a list of products (see table 1) ranging from 300 e. p. gasoline down through naphthas, kerosene, light fuel and gas oil, wax distillate, cylinder stock and flux are processed.

Flow Through the Unit

The flow through the unit is conventional. The crude charge, after preheat through exchangers, flows to atmospheric furnace where temperature is raised to approximately 550° F., entering the atmospheric fractionating column at this level. The 300 e. p. gasoline is taken overhead and heavy naphtha, refined oil and heavy gas oil are taken as side streams. The reduced crude of 26.9° A. P. I. gravity is transferred by pump through exchangers to a vacuum heater where temperature is raised to about 660° F., and delivered to the vacuum fractionator at this temperature. Gas oil is taken overhead from the vacuum column and wax distillate and cylinder stock are taken as side streams. Vacuum on this column is supplied by barometric condenser and auxiliary air jets.

Design of the plant is such that operators have the option of taking an overhead cylinder stock cut for 150 vis. at 210° F., in which procedure a slop cut is made between the distillate and cylinder stock. Fuel requirements of the plant are about 3.2 per cent of crude charge. Steam consumption is about 11,000 pounds per hour of low pressure and 3,000 pounds per hour at high pressure. The low-pressure steam requirements are furnished as exhaust steam from steam-driven pumps. Remainder of the pumps are motor driven.

Tests on the light products are shown in Table 2.

The aluminum foil insulation practice employed on the new fractionating columns at the Buffalo plant represents one of the first large scale applications of the material to refinery construction.

This insulation employed on the Buffalo job consists of several sheets of aluminum foil crumpled and placed one on top of another in a prefabricated container. The container consists of an outside covering of solid metal coated with aluminum paint. Interior of the prefabricated containers, or the side resting against the outer surface of the fractionating columns are constructed of metal mesh holding the crumpled sheets of aluminum foil in permanent position. The containers are built to specification for each job with cut-outs provided for column fittings and inspection plates.

The longitudinal edges of each container are bent back forming a groove for the metal lock strip which holds the several sections together and is removable at any particular point for repair or inspection without disturbing remainder of the insulation covering. By replacing the panels and reinserting the metal lock strips, sections of the insulation can be reapplied for further service, after completing any necessary repair or inspection to the column or fittings. Each succeeding ring of panels is placed on top of the one below and an offset between the edge of the mesh basket and the outside metal sheet, forms a joint impervious to liquids from above, much after the fashion of shingles placed one over another.

TABLE 1—YIELD DATA

300 e. p. gasoline	16 per cent
Heavy naphtha	9 per cent
Refined oil	11 5 per cent
No. 2 fuel oil	8 3 per cent
Gas oil	5 6 per cent
Wax distillate	24 per cent
Old cycle stock	18 8 per cent
Flux	5 6 per cent
Gas and loss	1.2 per cent

TABLE 2—TESTS ON LIGHT PRODUCTS

	300 e.p. light gasoline	Heavy naphtha	Refined oil
Gravity	67 8°	50 2°	42 7°
10 per cent	92°F	285°F	370°F
50 per cent	208	332	446
90 per cent	259	366	497
Endpoint	298	399	544
Octane	57	...	...

	Light gas oil	Heavy gas oil
Gravity	37 7°	35 3°
Flash	189°F	230°F
Pour	0°F	20°F
Visc. at 100°	34	45

	Wax distillate	Cylinder stock	Flux residue
Gravity	30 7°	23 4°	..
Flash	365°F	535°F	
Pour	70°F	110°F	103°F Soft point
Vis. at 100° at 210°	85 ...	105	792 Furol

Aluminum foil insulation used on towers

Alloys for Use Under Extreme Conditions Show Progress

The past year has seen a strongly established trend toward the use of alloys of special compositions for specific service requirements. This has been notably true in the field of materials for use under extremes of corrosion and wear. For instance, difficulties of obtaining materials suitable for the requirements of chemical processing equipment are now being overcome by alloys developed for economical use under exposure to such severely corrosive substances as hydrochloric acid, sulfuric acid, inorganic acid salt solutions and strong oxidizing agents like wet chlorine.

Outstanding in the development of corrosion-resistant materials has been the introduction of a nickel-molybdenum-iron alloy. This recent addition to the Haynes stellite series of alloys possesses unusually good physical properties coupled with exceptional resistance to the action of all concentrations of hydrochloric acid at temperatures up to and including the boiling point. Its strength is comparable to a strong alloy steel, and it can be rolled and formed into sheets and plates—an unusual combination of properties for a highly corrosion-resistant material.

Hard-faced parts are now standard in the manufacture of products in a variety of industries. Typical examples which show the diversity of uses of equipment now employing hard-facing alloys include oil refinery pump shaft sleeves, steam valve trim, seating surfaces of automotive and aircraft valves and valve seat inserts, cutter plates of sewage comminutors, and oil well drilling bits.

New designs of high-temperature, high-pressure steam valves which overcome many former difficulties are now being made possible by hard-facing and seating surfaces with Haynes stellite, the hard-facing alloy of cobalt, chromium and tungsten. Valves having hard-faced trim have been used for over five years for the highest temperatures and pressures, but now specifications are being extended to include hard-facing of steam valves for pressures as low as 150 pounds per square inch because they have been found highly dependable.

An interesting application requiring alloys having resistance to both wear and corrosion is that of automatic check valves for stopping the reverse flow of oil in pumping wells. The combination of valve balls ground from castings of Hastelloy D, together with hard-faced seat rings, has proved especially suitable for handling high-sulfur crudes.

Effect of Operating Conditions and Fuels on Diesel Engine Deposits

By J. R. MacGREGOR and W. V. HANLEY
Standard Oil Co. of California

Most of the published information on the performance of fuels in high-speed diesel engines has dealt with the initiation of combustion or the delay in initiation of combustion. Both of these phenomena have been found to correlate at least approximately with ease of starting, knocking, and formation of exhaust smoke. For this reason they have been and still are of considerable importance.

Less work has been done on the later phases of the combustion process which includes the rate of burning, duration of combustion, and completeness of burning. As in the case of the otto-cycle engine, the study of the actual combustion process in a high-speed diesel engine is fraught with many difficulties. Temperatures, pressures, and volumes

S.A.E.—Presented at annual meeting, Detroit, Mich., January 10 to 14, 1938.

all vary between wide limits and the total interval of time involved in these changes must of necessity be measured in micro seconds. For these reasons highly specialized instrumentation is required.

Among the methods which have been used to investigate the combustion process are the following: Sodium line reversal method of measuring temperature,[1,2,3,4] spectroscopic analysis of radiation,[5,6] Schlieren photography showing flame movement by difference in refraction of gases of different density,[7,8] instantaneous sampling,[9,10] ionization gaps indicating presence and location of flame,[11,12,13] inertialess pressure and rate of change of pressure indicators, radiometric measurement of flame temperature,[14,15] photoelectric detection of flame travel,[16] high-speed flame photography,[17,18,19,20] and quantitative measurement of fuel deposits.[21]

In order to study the last phase of combustion process four of these methods have been investigated in the laboratory of the Standard Oil Co. of California. Typical results from tests in these diesel engines have been selected for the following presentation:

The first method made use of a precombustion chamber type engine which was fitted with a glass window through which the flame illumination was transmitted to a photo tube. By means of a thryatron relay connected to the photo tube, a neon light mounted on the flywheel was used to stroboscopically indicate the beginning and end of inflammation. The second method was similar to the first except that the presence of flame was detected by an ionic gap. The third method made use of an engine indicator of a new type and cathode ray oscillograph for studying the rate of pressure rise. The fourth method, to be described in detail, was the inferential method of testing a variety of fuels under various controlled engine conditions and studying the resulting engine deposits as an indication of completeness of combustion. Since cases of stuck rings and valves and excessive engine deposits have been observed in the field in some engines under certain operating conditions, this last method has the advantage of yielding results which are indicative of service performance apparent to the engine operator.

Besides studying the combustion processes it was desired to develop an accelerated method of test in the laboratory service engine that would yield results which would correlate with deposits in other popular service engines. A service engine, rather than an experimental engine, was used in the laboratory in order to more closely approximate field conditions. It was considered permissible to alter the test conditions in the laboratory engine as required, to obtain a reproducible quantity of deposit sufficiently large to weigh accurately, provided the conditions selected were at some time encountered in field operation.

After preliminary tests had indicated the type of engine most subject to the formation of deposits, the first step was to determine the effect of operating conditions in this engine on deposition, in order to select a set of conditions which would furnish reproducible results in a short time. It is known that engine deposits are influenced by both lubricating oil and fuel and in order to exaggerate the influence of the fuel, it was desired to have the lubricating oil exert as small an influence as possible. For this reason two well-known and commonly used types of lubricants were tried in order to select the lubricant which would contribute the least to engine deposits. Table 1 shows the results of these lubricating oil tests.

It will be noted that in the case of fuel 1, which was a normal straightrun distillate, the total deposit with lubricating oil B was 156 per cent of that obtained with lubricating oil A. With fuel 2, which was a different type of straightrun distillate, lubricating oil B former 121 per cent of the deposit obtained with lubricant A. Lubricating oil A was therefore selected for all the subsequent fuel tests.

Load has also been known to have an influence on engine deposits and tests were therefore carried out, covering a range from idle to three-quarters, to evaluate its effect in the test engine. The effect of load is evaluated in Figure 1. As shown, the total deposit at idle was approximately five times that at three-quarters load.

The effect of load is partially attributable to changes in engine temperature and a range of the operating temperatures that are subject to control was therefore investigated. The temperatures controlled were intake air, jacket and lubricating oil. Lowering the intake temperatures from 150° to 100° F. increased the deposit in the combustion chamber but had no effect on exhaust valve deposit. These results are shown in detail in Table 2 and the effect of jacket temperatures on deposits is shown in Table 3.

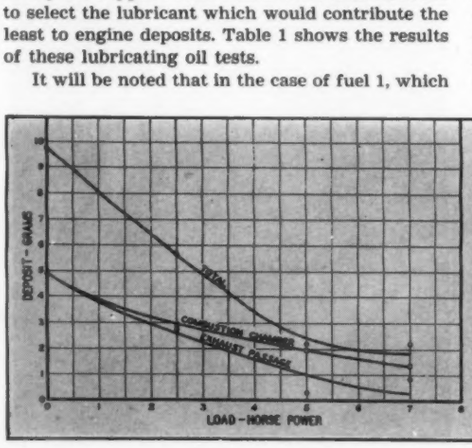
TABLE 1—COMPARISON OF ENGINE DEPOSITS WITH TWO TYPES OF LUBRICATING OILS

Lubricating oil	A	B	A	B
Fuel	1	1	2	2
Engine deposit—				
Combustion chamber:				
Grams	4 40	6 26	2 94	3 86
Per cent	100	142	100	131
Nozzle:				
Grams	0 08	0 23	0 40	0 14
Per cent	100	288	100	35
Exhaust valve:				
Grams	0 46	1 20	0 27	0 39
Per cent	100	262	100	144
Total:				
Grams	4 94	7 69	3 61	4 39
Per cent	100	156	100	121

TABLE 2—EFFECT OF INTAKE AIR TEMPERATURE ON ENGINE DEPOSITS

Intake air temperature, °F.	150	100
Engine deposits—		
Combustion chamber:		
Grams	2 76	4 86
Per cent	100	176
Nozzle:		
Grams	0 17	0 15
Per cent	100	88
Exhaust valve:		
Grams	0 37	0 38
Per cent	100	102
Total:		
Grams	3 30	5 39
Per cent	100	163

It will be noted that an increase in deposit except at the nozzle, resulted from a decrease in jacket temperature from 200° to 150° F. However, when comparing results shown for 150° with those of 125° very little change is indicated, the difference being within the range of experimental error. Likewise a change in lubricating oil temperature



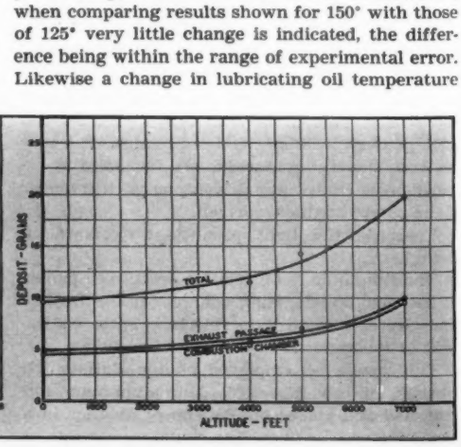


Fig. 1—Effect of load on engine deposition *Fig. 2—Effect of altitude on engine deposition*

from 130° to 160° F. was found to have no appreciable effect, the difference in engine deposits being less than the experimental error.

Excessive fuel quantities or over-rich mixtures are known to also increase deposits in diesel engines. In normal sea-level operation the air-fuel ratio could not be reduced by means of increasing the fuel quantity without, at the same time, increasing the load and the combustion chamber temperatures, both of which had previously been found to minimize the formations of deposits. Therefore, at idle load, the intake air was throttled to simulate altitude operation in an effort to obtain rich mixtures as well as low operating temperatures. A range of altitudes from sea-level to 7,000 feet was covered. As shown by Figure 2 the total engine deposit was approximately doubled by the simulated change of 7,000 feet in altitude. The fuel used in these tests did not cause the rings to stick under any operating conditions within the 24-hour period, but ring sticking was obtained in subsequent tests with certain fuels at the higher altitudes even though no ring sticking occurred with those fuels at sea-level.

The tests indicated that large quantities of deposit could be obtained in a relatively short time by the proper choice of operating conditions. In order to determine the duration of tests required to yield significant comparisons and also as a means of extrapolating the data obtained from short-time tests, a series of runs were made with a total testing time varying from 24 to 300 hours. The results of these tests are shown in Figure 3. The combustion chamber deposit was substantially constant after 24 hours while in the exhaust passages the deposit increased continuously with increase in running time. Apparently the high temperature and turbulence existing within the combustion

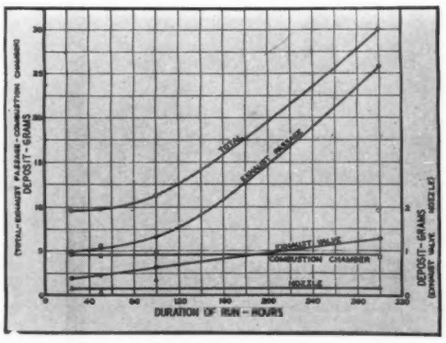


Fig. 3—Effect of length of run on deposition

chamber caused the deposit to be removed as rapidly as formed after a certain point had been reached. That this point was reached before 24 hours was verified by later tests with heavy residual type fuels in which it was found that unless sufficient combustion chamber deposit was formed before 24 hours to stop the engine, failure did not occur from this cause regardless of the length of run. In addition, these tests showed that with residual type fuels, and also with certain distillate fuels, the exhaust deposit was occasionally of sufficient magnitude to stop the engine. This occurred at a varying number of hours of running time beyond 24 hours.

From the results obtained in the preliminary investigation of operating variables it was possible to select a set of operating conditions for an accelerated test for diesel fuel deposition. The following set of test conditions was selected:

Load	Idle
Speed	800 r.p.m.
Altitude	5,000 feet
Duration of test	24 hours
Jacket temperature	150° F.
Lubricating oil temperature	130° to 160° F.

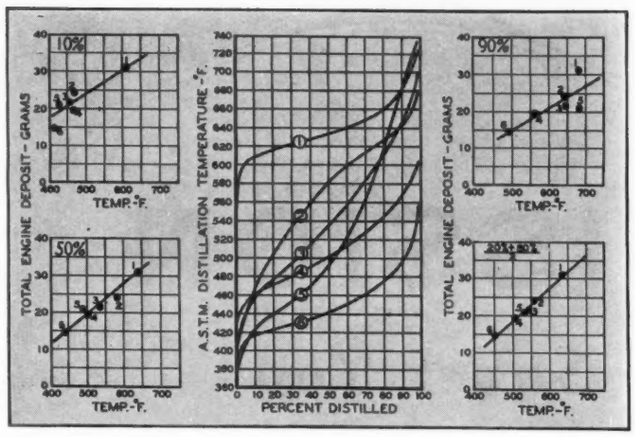


Fig. 4—Effect of A.S.T.M. distillation on engine deposition

To determine if the accelerated test was sufficiently reproducible, a typical straightrun distillate fuel was retested at intervals over a four-month period. The results of these check tests are shown in Table 4.

Considering the magnitude of the deposits obtained, as shown by the average values, the reproducibility is considered satisfactory for this method of measurement. Further correlating tests were required, however, to determine if the differences between fuels of various physical properties, indicated by this laboratory test method, would be indicative of results obtained in other service engines under more normal operating conditions.

Relations Between Physical Properties of Fuels and Engine Deposits

Volatility is a common physical property which varies widely in marketed diesel fuels. There have been differences of opinion as to the proper volatility range required for high-speed diesel engines and to determine the effect of volatility on engine deposition various cuts of a normal fuel were selected. These special distillates were prepared to cover a range in boiling points wider than normally encountered in commercial fuels. That particular care was required in the distillation of such fuels was indicated by a test in which 1 per cent of residual type diesel fuel was added to a normal distillate. In this case the nozzle deposit was increased 10 times and the exhaust valve deposit was approximately doubled. This effect was avoided in the special fuels selected for the volatility test by the use of good fractionation. The distillation data for the fuels used are shown in Figure 4 as well as the results obtained in the deposition tests. The best correlation of engine deposit with volatility is indicated by the average volatility as

TABLE 3—EFFECT OF JACKET TEMPERATURE ON ENGINE DEPOSITS

Jacket temperature, °F.	200	150	125
Engine deposits—			
Combustion chamber:			
Grams	3.00	4.80	4.00
Per cent	100	160	133
Nozzle:			
Grams	0.21	0.15	0.11
Per cent	100	71	52
Exhaust valve:			
Grams	0.29	0.36	0.44
Per cent	100	124	152
Total:			
Grams	6.86	9.78	9.44
Per cent	100	142	138

TABLE 4—COMPARISON OF CHECK TESTS COVERING A FOUR-MONTH PERIOD

	Deposit weight—grams			
	Combustion chamber	Nozzle	Exhaust Valve	Total
	7.22	0.27	0.53	14.45
	7.50	0.27	0.64	14.60
	7.81	0.13	0.63	15.06
	7.83	0.29	0.67	15.35
Average	7.59	0.24	0.62	14.86
Max. positive deviation	.24	0.05	0.05	.49
Max. negative deviation	.37	0.11	0.09	.41

computed from the 20 per cent and 80 per cent A.S.T.M. distillation temperatures. The 50 per cent point provided slightly poorer correlation, but for convenience, affords a reasonably accurate criterion. The 10 per cent and 90 per cent temperatures showed no consistent relation to engine deposits.

Conradson carbon has been commonly used as an indication of the burning qualities of diesel fuels. An attempt was therefore made to correlate Conradson carbon and engine deposits for a variety of fuels, as shown by Figure 5, for normal distillate fuels, the Conradson carbon values were so nearly alike and close to the minimum measurable that this carbon residue test failed to indicate the relative engine deposition. For residual type fuels of the A.S.T.M. classification No. 4 type and heavier, good agreement was indicated between Conradson carbon and engine deposits. The Conradson carbon of 10 per cent bottoms from conventional A.S.T.M. gas oil distillation of burner fuels has been proposed as an indication of burning performance.[20] Since burner combustion may be considered somewhat analogous to diesel engine combustion, this test was applied to the fuels investigated for engine deposition. Figure 5 shows that for the normal distillate

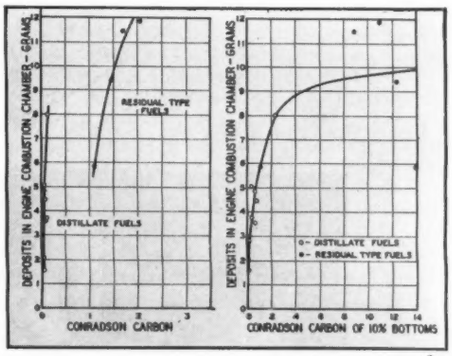


Fig. 5—Correlation of combustion chamber deposits with carbon residue tests

fuels or distillates with small amounts of contaminants this carbon residue test provided a fair indication of engine deposition. For residual fuels no correlation is apparent. Another carbon residue test has been proposed in which the usual Conradson carbon test procedure is followed except that once the fuel is ignited the heating flame is removed.[21] This method was investigated but the correlation with engine deposit for normal distillate fuels was found to be considerably poorer than the 10 per cent bottoms Conradson carbon and for the residual fuels no correlation was found. Since poorer correlation was shown for all fuels, results by this method have not been included.

There was some indication that the engine deposits with normal distillate fuels depended somewhat on the ignition quality. Tests were therefore made with fuels covering a range of cetane numbers. The relation shown in Figure 6 was obtained by plotting engine deposition results versus cetane numbers as determined by the magnetic pickup delay method. A fair correlation was indicated for all the fuels tested including straightrun, cracked and doped fuels. Correlation with cetane number determined by a critical compression pressure method was found to be somewhat less exact. The results shown for doped fuels are of special interest. Two entirely different types of dopes were added to the same low-cetane fuel and the engine deposits obtained were in close agreement with the improvement in cetane number. . . .

Although ring sticking was not as reproducible

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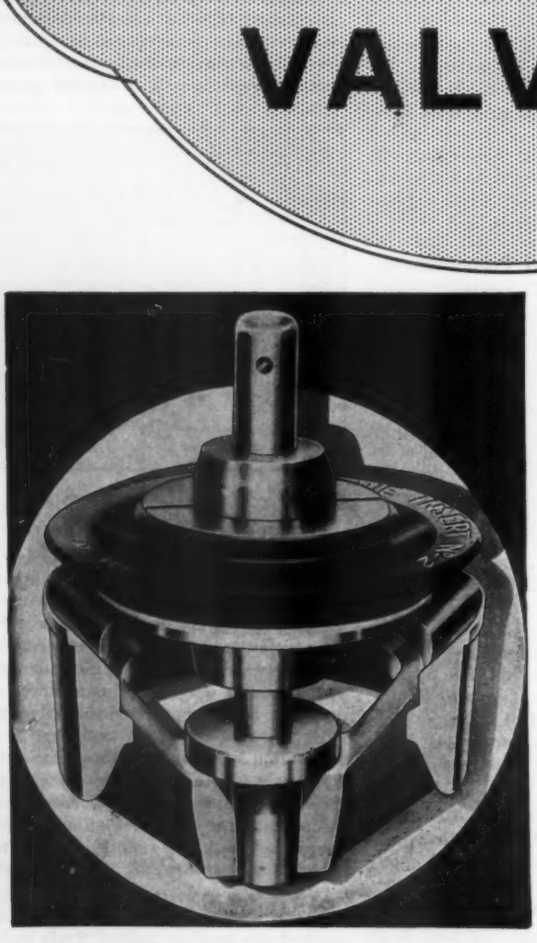

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as the other phases of the tests, frequent ring sticking occurred during the check tests with the low cetane undope fuel. The reduction in deposits with the doped fuels might have been the result of solvent action of the dopes on the deposit. However, the use of two widely different types of dopes with similar results is believed to have precluded this possibility.

An examination of Figure 6 shows that the cracked fuels were intermediate to the extremes of the distillates. In this engine this appeared to be merely a function of cetane number and the general conclusion that all cracked fuels cause greater engine deposits than straightrun fuels is apparently not justified.

Comparison of Laboratory Service Engine Results With Other Service Engines

The direct injection engine used in the laboratory tests was chosen because it was known to be critical to fuel deposition characteristics. Tests were therefore made in three other popular makes of high-speed diesel engines to determine the degree of correlation between the fuel sensitive direct injection engine and other service engines. Such tests, in addition to indicating the degree of correlation with the direct injection test engine, also afforded a means of determining the relative deposition characteristics of the various makes of engines. The first engine investigated was of the precombustion chamber type identified as engine B. A variety of fuels, including straightrun and cracked distillates and residual types, was investigated. The correlation between the deposits in this engine and the test engine is shown in Figure 7. Good correlation is indicated between the results in the two engines for the exhaust valve deposits. Within the combustion chamber fair correlation

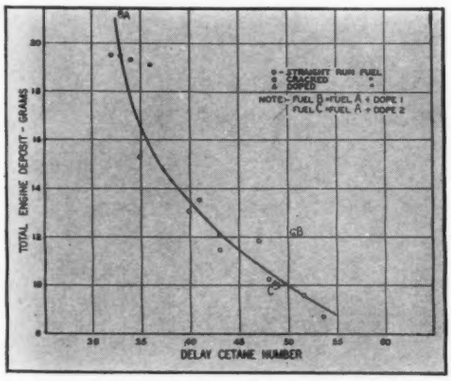

Fig. 6—Effect of delay cetane number on engine deposition

is indicated for the distillate fuels and poor correlation for the residual types fuels. At the nozzle, although the correlation with distillates is good, no correlation exists for the residual fuels. This may be explained by the different types of nozzles employed. In the engine in which the nozzle deposits were greatest, a three-hole nozzle was used, while in the other engine the pintle type was employed. Similar operating conditions were used in the two engines and it will be noted that the total combustion chamber deposits are within the same range for the distillate fuels. For the residual fuels a marked increase in the deposit compared to the poorest distillate fuel was found in the direct injection engine, "A," while in the precombustion chamber engine "B," the deposit with the residual fuels was only slightly greater than for the poorest distillate fuels. The exhaust valve deposit in this engine "B" was smaller than in the direct injection engine for all fuels. . . .

In summary it may be concluded that in these diesel engines which are critical to fuel deposition, a decrease in operating temperature and load or an increase in altitude increases the quantity of deposits formed. In these engines increasing the average volatility or the cetane number of the fuel decreases the deposit.

An approximation of the deposition tendencies of distillate fuels in engines which form appreciable amounts of deposits may be obtained from the Conradson carbon of the 10 per cent bottoms remaining after 90 per cent has been distilled off in the conventional A.S.T.M. gas oil distillation. For fuels of this type the usual Conradson carbon test

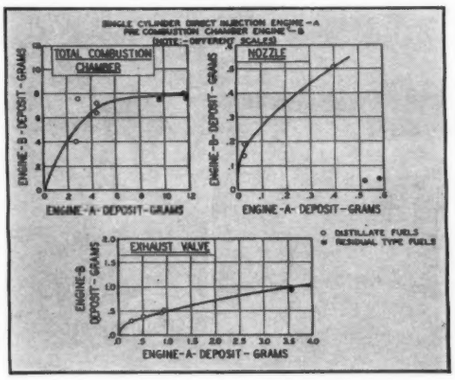

Fig. 7—Comparison of deposits in precombustion chamber and injection engines

fails to correlate with engine deposits. For residual type fuels the Conradson carbon test provides a convenient means of predicting engine deposition characteristics while Conradson carbon of the A.S.T.M. distillation 10 per cent bottoms is valueless.

In those engines in which fuel deposition is slight no consistent difference between fuels and no correlation with physical properties of the fuels are apparent.

These tests, covering a wide variety of engine designs, fuels and operating conditions, have demonstrated that the engine designer has greater control over the quantity of deposits formed in the engine than either the fuel refiner or engine operator as indicated by the test results presented in which the ratios of deposits were 20 to 1 between extremes in engine design, 10 to 1 in operating conditions and 3 to 1 between extremes in distillate fuels.

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Sludging Characteristics

(Continued from Page 86)

an almost straight line relation between the five-minute oxidation numbers and oxidation values obtained with the Indiana apparatus in 100 hours. Figure 5 shows this relation. The Indiana values are presented through the courtesy of the Nebraska State Highway Laboratory. It may be stated that no oils have as yet been found which vary from the curve of Figure 5 beyond permissible experimental error.

The comparison of a five-minute run with one of 100 hours at first may seem absurd. Yet when we consider what must be taking place in the oil, the relation is in reality quite close. The portions of the oil which oxidize readily will show traces of decomposition almost immediately after heat and air are applied. In a few minutes nearly all, if not all, of this oil has responded to treatment. A colorimeter comparison apparatus is merely a device to establish an arbitrary evaluation of the reaction. Now when oxidation is carried beyond this first stage, these unstable portions are merely thickened to a point where physical or chemical means may be used for their separation.

In conclusion, it is believed that:

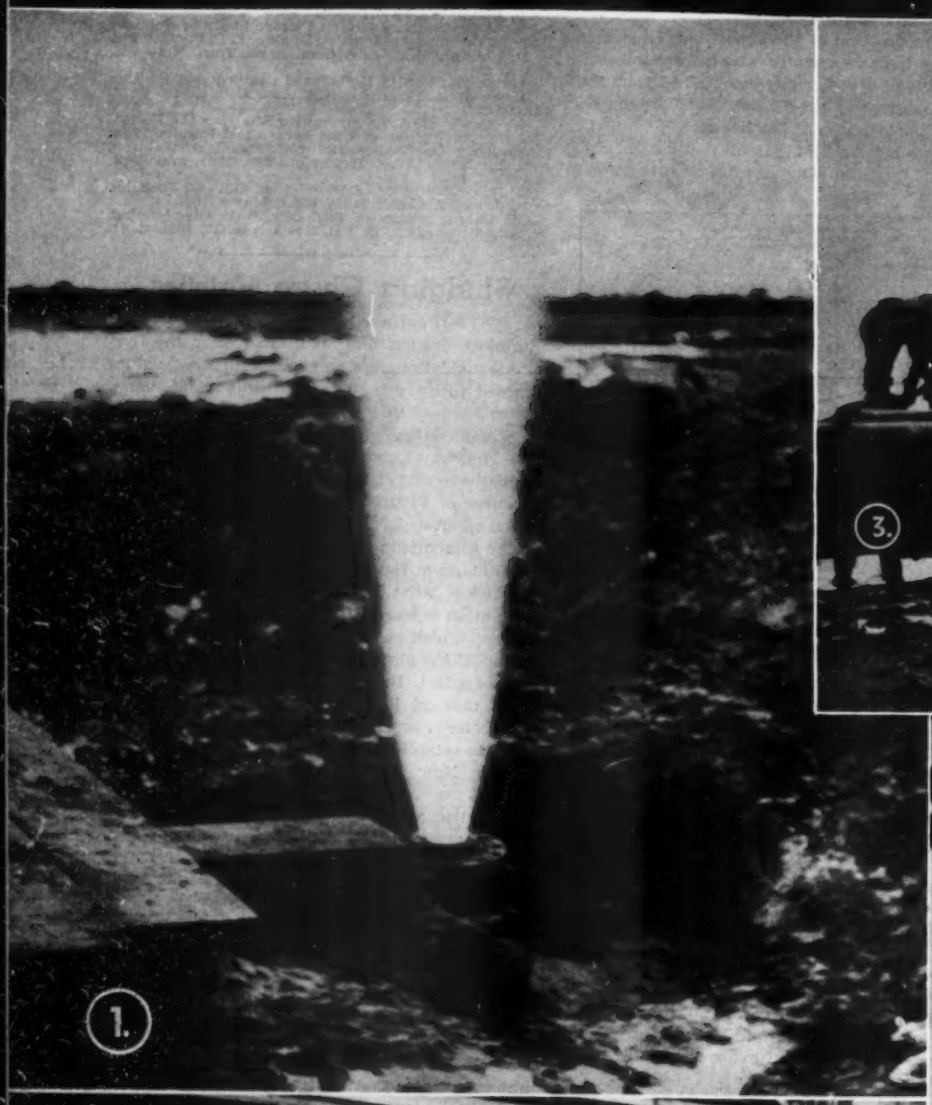
1. This simplified oxidation test lends itself well to duplication of results.
2. These oxidation numbers promise to be a good index of the gumming or sludging characteristics of an oil.
3. Within limits, oil oxidation is an exponential function of the temperature.
4. Oxidation curves at constant temperature give information relative to the base, blend and refining process (solvent extraction).
5. Oil oxidation is closely related to the unsaturated hydrocarbon content of the oil.
6. The presence of fatty oils modifies the oxidation characteristics of an oil.
7. Oxidation curves promise to predict the useful life of an oil.

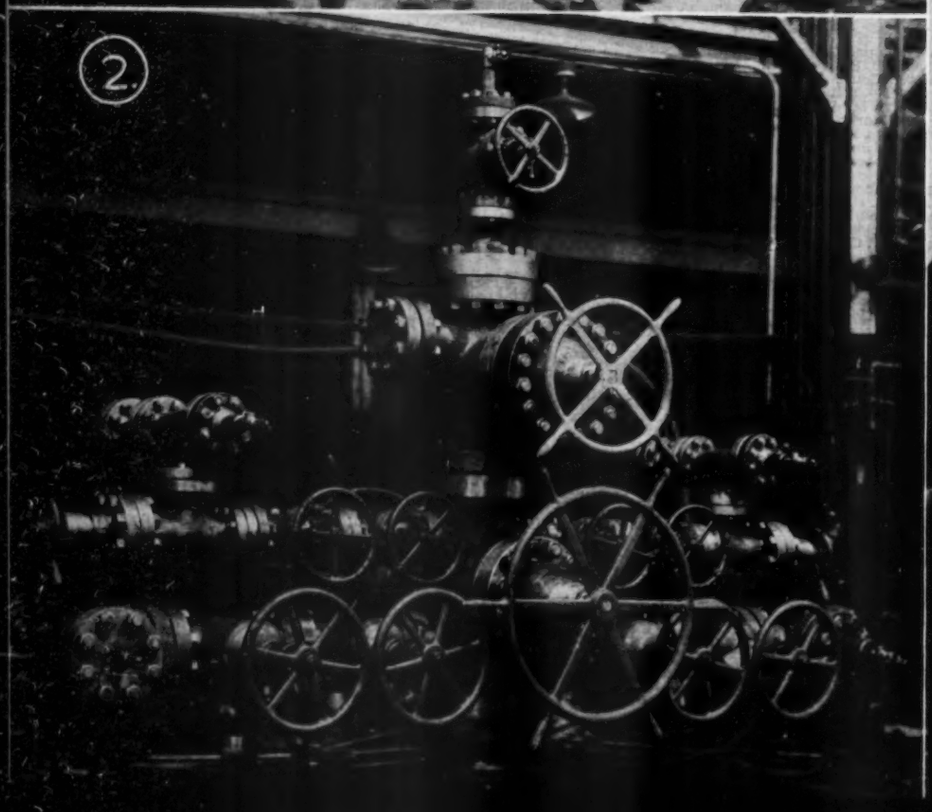
Eastern District Plans Spring Meeting in Pittsburgh

April 28 and 29, 1938, have been selected as the dates for the 1938 spring meeting of the eastern district of the American Petroleum Institute's Division of Production, which will be held in the William Penn Hotel at Pittsburgh, Pa. F. E. Eckert, of Hanley & Bird, Bradford, Pa., chairman of the eastern district, will be chairman of the general committee in charge.

Other committees have been appointed as follows: Program, T. H. Myers, Carnegie Natural Gas Co., Pittsburgh; D. T. Ring, Ohio Fuel Gas Co., Columbus, Ohio; and George Wittmer, III, Wittmer Oil & Gas Co., Pittsburgh; publicity, Fred A. Benkert, Peoples Natural Gas Co., Pittsburgh; registration, J. J. Schmidt, East Ohio Gas Co., Cleveland, Ohio; and arrangements, Christy Payne, Jr., Peoples Natural Gas Co., Pittsburgh. Chairman Eckert now is soliciting suggestions for speakers and topics for discussion.

What Happened





dat Palacios –

1. When abnormal pressure from below 9,200 feet, estimated between 5,500 lbs. and 6,000 lbs., blew off surface control fittings, this flanged connection was left up.
2. Cameron Iron Works, Inc., was commissioned Saturday, January 8, to build this 10,000 lbs. test control manifold, assembled on a Cameron 10,000 lbs. Test Type 7-MR Manually Operated Control Head, and a 10,000 lbs. Test Type 7-SR Manually Operated Master Gate Valve, fitted with self-feeding gate packers to compensate for cutting action of well streams.
3. Special manifold arrives on location 48 hours after order issued.
4. M. M. Kinley fire extinguishing crew stabbing control manifold to flanged casing head.
5. Kinley crew members installing companion flange and nipple to top flange of Cameron Type SR Master Gate Valve, to permit installation of tie-down clamps.
6. Kinley crew swinging flange and nipple into place.
7. Control manifold stabbed-on and bolted and tied-down, ready to close Cameron Type SR Master Gate Valve. While flow connections were being installed and other preparations made, well blew through Cameron control manifold from 2:30 p.m. Monday, January 10, to 5:10 p.m. Wednesday, January 12.
8. After 50 hours of continuous blowing, when Cameron Type SR Master Gate Valve was finally closed it made a positive shut-off, with no sign of leakage. On a ¾" choke, well pressure on control manifold gauged 2,200 pounds.

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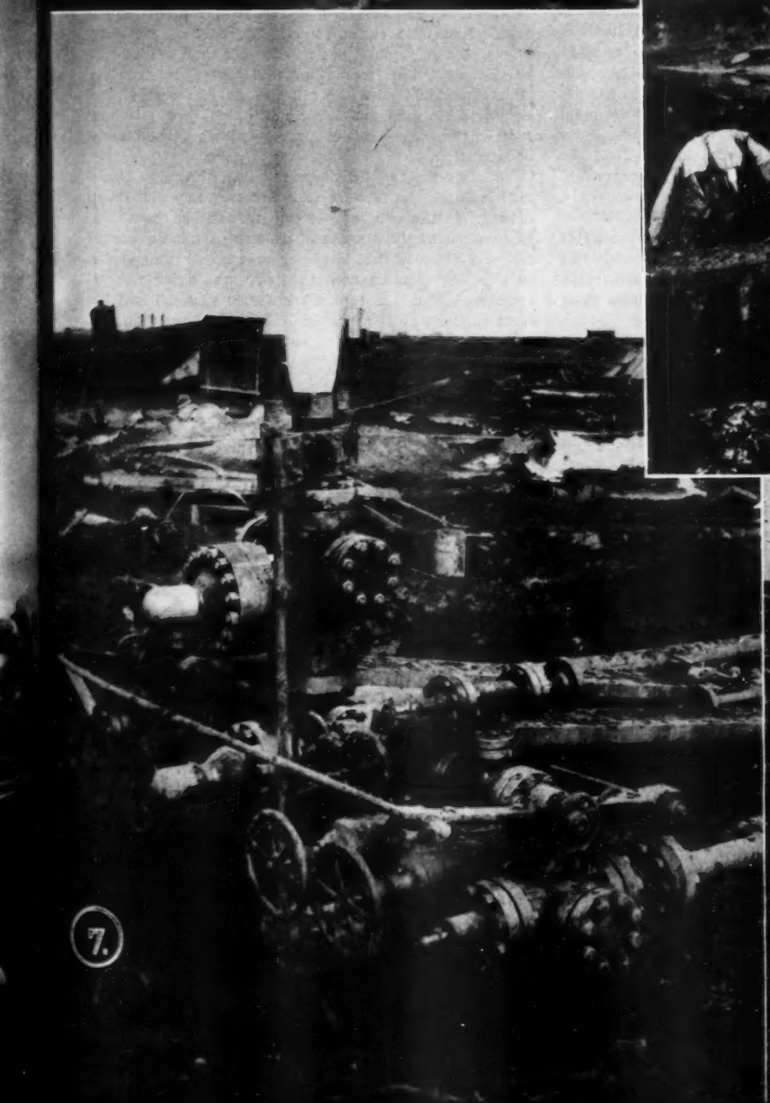

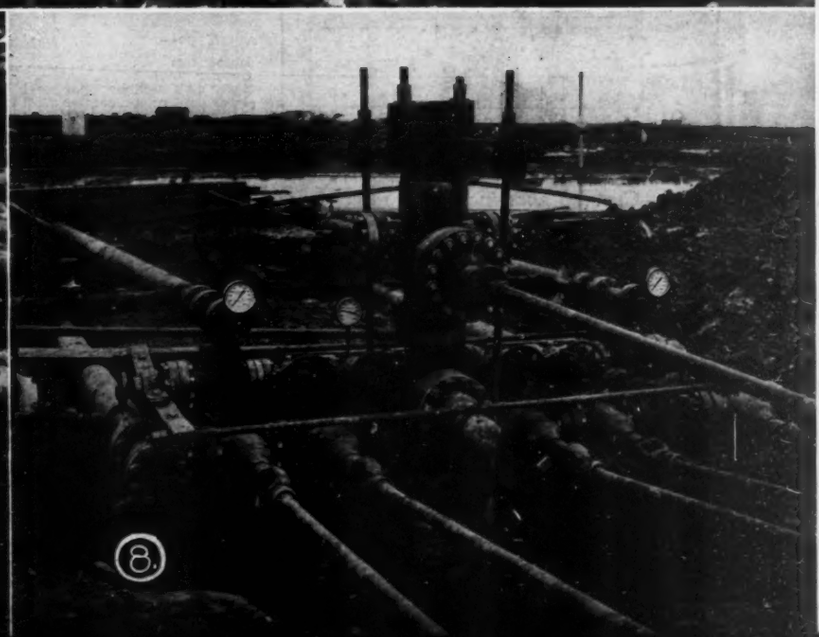

Progress in METALS

By W. L. NELSON

Metallurgical Terms

Malleabilizing

Malleabilizing is the process of heating white cast iron at a temperature of about 750° C. until the carbon in the iron has accumulated into pockets leaving a matrix of almost pure iron. At the same time, carbon migrates to the surface leaving an outer surface that is almost free from carbon. This operation is also referred to as "annealing" of white castings. About 2 or 3 days of heating are required for malleabilizing.

The brittleness of regular cast iron makes it unsuitable for many small or intricate castings and hence malleable iron fittings and castings fill a widespread need in the manufacture of such articles as pipe fittings, farm machinery, hardware fittings, railroad-car fittings and cheap tools.

Theory of Creep Strength

At elevated temperatures steels tend to gradually stretch or deform. However, the rate of stretch is not a uniform function of temperature. At relatively low temperatures the metal becomes harder as it deforms with the result that the metal does not weaken rapidly whereas at higher temperatures the deformed or broken

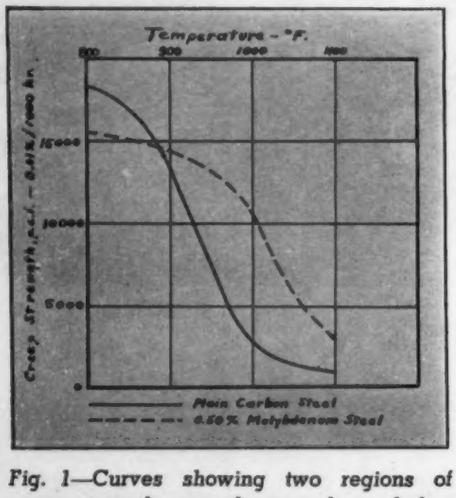

Fig. 1—Curves showing two regions of creep strength, one above and one below the equicohesive temperature

grains of material are capable of recrystallizing or healing themselves with the result that the material is always ductile and stretches at a relatively low pressure. The temperature at which this change takes place is referred as as the eqicohesive temperature or the lowest temperature of recrystallization of the steel.

Steels stressed at a temperature lower than the eqicohesive temperature stretch as in the regular creep-strength curves the trend of which seems to be to approach a complete healing of creep or stretch. Above the equicohesive temperature the steel stretches much more rapidly and ultimate failure occurs after a short time. These two kinds of stretch, i. e. below and above the equicohesive temperature, are illustrated by each of the two curves shown in Figure 1. Each of these two curves indicate two regions of creep strength —one at low temperatures, then a rapid loss in strength in and about the equicohesive temperature, and finally another portion of somewhat constant strength above the equicohesive temperature. Note that the plain carbon steel loses strength rapidly at about 900° F. whereas the 0.5 molybdenum steel has an equicohesive temperature of about 1,030° F. The higher recrystallization temperature of the molybdenum steel accounts for its extensive use as a material for high-temperature tubes in pipestills and boilers.

Alloy Steels Have Arrived

For years the advantages of using low percentage alloy steels rather than plain carbon steel, have been recognized and advertised but the natural reluctance of purchasers to adopt new materials has delayed widespread use. However, the use of such steels has now grown to such proportions and is increasing so rapidly that alloy steels may soon be "the rule" and the plain carbon steels "the exception." This applies particularly to transportation equipment because in this field the advantage of decreased weight is doubly important.

Although many trade name alloys are available a few of which are Cromansil, Cor-Ten, Konik, Jal-Ten, Yoley, Centralloy and the SA.E. steels, all of the steels have somewhat the same general characteristics and purposes. These general properties can be illustrated by data on the Cor-Ten alloy of the United States Steel Corp. (Table 1).

The corrosion resistance of Cor-Ten as compared with copper steel and carbon steel is indicated in Table 2.

Low-alloy steels that do not contain chromium are also resistant to mild corrosion but not to the degree shown in Table 1. The use of copper up to percentages of 0.5 per cent aids in the corrosion resistance and if nickel is also used, the percentage of copper may be increased to 1 per cent with an increase in corrosion

TABLE 1—PHYSICAL PROPERTIES OF COR-TEN

Property—	Regular open hearth	U.S.S. Cor-Ten
Yield point, lb. per sq. in.	25,000– 30,000 min.	50,000–60,000 min.
Tensile strength, lb. per sq. in.	35,000–*60,000 min.	65,000–75,000 min.
Elongation, per cent in 2 in.	34–25	27–22
Endurance limit lb. per sq. ft. (normalized)	25,000	45,000
Charpy impact, ft. lb. (as rolled)	30	40

*High value for hot-rolled products.

TABLE 2—CORROSION RESISTANCE OF COR-TEN* (APPROXIMATELY)

Condition—	Time Mo.	Cor-Ten	Copper steel	Structural steel
Industrial atmosphere ..	12	0 18	0 29	....
Industrial atmosphere ..	36	0 26	0 48	....
Hot aevated soft municipal water	6	0 62	....	1 27
Hot aevated soft municipal water	12	0 82	....	1 62
Aevated salt water	6	0 23	....	0 92
Aevated salt water	12	0 36	....	1 56

*Recent bulletin of U.S.S. Corp. entitled "Cor-Ten."

resistance. These effects are illustrated in Tables 3 and 4, which were presented by N. B. Pilling, of the International Nickel Co., on page 30 of "Symposium on High-Strength Construction Metals," published by the A.S.T.M., March 4, 1936.

The advantages of low-alloy steels fall into two main groups: (1) they permit a lighter construction and (2) they are more resistant to mild corrosion. Regarding weldability, ease of shop operations, and fabrication, the alloy steels now available are all as easily handled as mild carbon steel. The cost of the alloy steels on a per pound basis is greater than the cost of carbon steel, but because of the lighter construction that is possible with the alloy steels, the cost of the complete finished article or machine is only slightly higher than the cost of corresponding carbon steel construction.

Being equal in the above respects, the alloy steels still maintain an advantage because of many indirect effects. In the case of gasoline trucks, the relatively low weight of the alloy steel trailers permit the carrying of a pay-load that is 25 per cent larger and results in a saving of more than $100 per month for a large tank-truck. Such a tank-truck (4,000 pounds) can be built of Cor-Ten at a cost of only $100 more than the cost of a mild steel job. Thus, the largest gasoline-handling outfit in the world was constructed of Cor-Ten.

TABLE 3—ATMOSPHERIC CORROSION OF 0.020-INCH THICK STRIP

Type—	Composition, per cent: Carbon	Copper	Nickel	Life to first perforation, year: Rural	Marine	Moderate industrial	Heavy industrial
Ingot iron	0.04		...	over 10	1.5	1.5	1.5
Copper steel	0.07	0.17	.	over 10	1.5	3.0	2.1
2 per cent nickel-copper steel	0.07	0.61	1.39	over 10	over 5	4	3.2
4 per cent nickel-copper steel	0.11	1.18	2.76	over 10	over 5	6	10
6 per cent nickel-copper steel	0.08	1.8	4.2	over 10	5	8	over 10

TABLE 4—ATMOSPHERIC CORROSION OF 0.015-INCH THICK STRIP

	Nominal composition, per cent: Carbon	Copper	Nickel	Manganese	Phosphorus	Molybdenum	Life to first perforation, months	
Production heats	0.10	0.01	...	0.40	0.11	...	12	
	0.02	0.06	...	0.02	0.008	...	24	
	0.10	0.21	...	0.40	0.11	...	35	
	0.02	0.20	...	0.39	0.006	...	35	
	0.10	0.46	...	0.12	0.02	0.09	31	
	0.05	0.87	1.05	0.17	...	...	over 37	
	0.05	0.93	1.77	0.13	...	...	over 37	
	0.06	0.03	1.96	0.14	...	...	over 37	
Experimental heats	0.05	0	0	0.3	0.01	...	19	14
	0.05	0.5	0	0.3	0.01	...	26	24
	0.05	1	0	0.3	0.01	...	31	31
	0.05	2	0	0.3	0.01	...	31	35
	0.05	0	1	0.3	0.01	...	28	over 37
	0.05	0.5	1	0.3	0.01	...	*over 37	over 37
	0.05	0	2	0.3	0.01	...	*over 37	31
	0.05	1	2	0.3	0.01	...	over 37	over 37
	...	2	2	...	...	...	over 37	over 37

*Failure approaching.

Measuring of Natural Gas Flow Simplified by the Use of Tables

By DONALD E. FUELLHART
Louisiana Department of Conservation

These tables[1] have been compiled primarily for use in obtaining measurements of gas for gas-oil ratios where the gas is not entirely measured by meters. The tables may also be used for obtaining open-flow capacity of gas wells when the impact pressure values are less than 15 pounds per square inch gauge. However, the practice of blowing wells open to obtain open-flow capacities is looked upon with disfavor when the "back-pressure method" can be used.

Fig. 1—Valve welded into 4-inch line to determine the differential pressure

The delivery rates in the tables are based on a pressure of 10 ounces above an atmospheric pressure of 14.4 pounds per square inch at a temperature of 60° F. and a specific gravity of 0.6 (air = 1.0) in accordance with section 13, Act 252 of 1924, Louisiana legislature. Delivery rates for pipe of diameters other than those given in Tables 1, 2 and 3 may be calculated by multiplying the values for 1-inch pipe by the square of the inside diameter of the pipe obtained from Table 4.

The tables which are based on Reids[2] formula have been checked by Duncan S. Cook.[3]

In oil fields producing gas with the oil it is customary practice to pipe that portion of the gas not used or marketed, a safe distance from the well and burn it. The gas used for field operations or marketed is usually measured by meters. In cases where all of the gas produced is burned at the riser in the vent line the flare frequently is of such intensity as to require extinguishing the flame before open-flow measurements could be obtained at the mouth of the vent line. Obtaining open-flow measurement at the mouth of the vent line (riser) is an unwieldy procedure on account of the distance from the ground and the fittings placed on the end of the riser to prevent the flame being extinguished by winds.

Theory of Differential Pressure Measurement: The static pressure of a gas stream as it leaves the pipe is atmospheric pressure, when the impact pressure is less than 15 pounds per square inch. Upstream from the opening of the pipe toward the reservoir both the static pressure and impact pressure increase, yet the difference between the two pressures remains constant. If the difference in pressure between the static pressure and impact pressure is obtained at any point in the flow line the result is the same as if the impact pressure alone were obtained where the gas stream leaves the pipe.

Obtaining Differential Pressures: At any convenient point in the vent line a connection is made for obtaining the differential pressure. Only the customary restrictions as to distances from

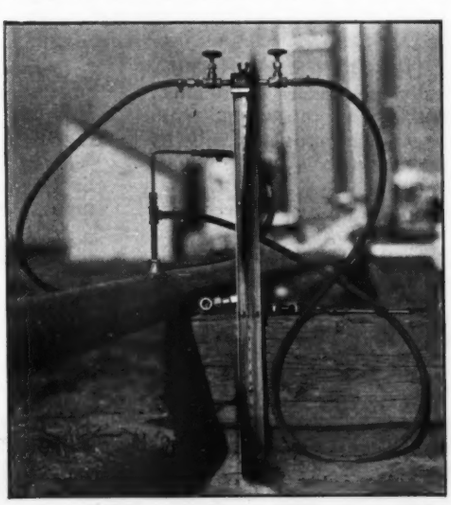

Fig. 2—Pitot tube and manometer connected to obtain differential pressure

[1]Impact pressures at center of pipe.
[2]See Reid, Walter, Open-Flow Determination of Gas Wells; Western Gas, November, 1929, p. 15, also Bureau of Mines, Monograph 7, Back Pressure Data on Natural Gas Wells and Their Application to Production Practices, by E. L. Rawlins and M. A. Schellhardt, pp. 127 to 140.
[3]Gas measurement engineer, Department of Conservation.

TABLE 1

Impact pressure, water inches	Inside diameter of pipe—inches 1	2	3	4	6	8
	Delivery rates—1,000 cubic feet per day					
0.1	10.73	43	97	172	386	687
0.2	15.18	61	137	243	546	972
0.3	18.59	74	167	297	669	1,190
0.4	21.47	86	193	344	773	1,374
0.5	24.00	96	216	384	864	1,536
0.6	26.29	105	237	421	947	1,684
0.7	28.40	113	256	454	1,022	1,818
0.8	30.35	121	272	484	1,089	1,936
0.9	32.20	129	290	515	1,160	2,061
1.0	33.94	136	305	543	1,221	2,172
1.1	35.60	142	320	570	1,282	2,278
1.2	37.16	149	334	595	1,338	2,378
1.3	38.69	155	348	619	1,393	2,476
1.4	40.15	161	361	642	1,445	2,570
1.5	41.58	166	374	665	1,495	2,661
1.6	42.94	172	386	687	1,546	2,748
1.7	44.26	177	398	708	1,592	2,830
1.8	45.55	182	410	729	1,640	2,915
1.9	46.77	187	421	748	1,684	2,993
2.0	47.99	192	431	767	1,727	3,071
2.2	50.33	201	453	805	1,812	3,222
2.4	52.57	210	473	841	1,893	3,365
2.6	54.71	219	492	875	1,970	3,501
2.8	56.78	227	511	908	2,044	3,634
3.0	58.78	235	528	940	2,114	3,758
3.2	60.72	243	546	971	2,184	3,884
3.4	62.58	250	563	1,001	2,253	4,005
3.6	64.38	258	580	1,032	2,322	4,127
3.8	66.15	265	595	1,058	2,381	4,234
4.0	67.88	272	611	1,086	2,444	4,344
4.2	69.54	278	626	1,113	2,503	4,451
4.4	71.17	285	641	1,139	2,562	4,555
4.6	72.80	291	655	1,165	2,621	4,659
4.8	74.36	297	669	1,190	2,677	4,759
5.0	75.89	304	683	1,214	2,732	4,857
5.2	77.38	310	696	1,238	2,786	4,952
5.4	78.88	316	710	1,262	2,840	5,048
5.6	80.30	321	723	1,285	2,891	5,139
5.8	81.73	327	736	1,308	2,942	5,231
6.0	83.12	332	748	1,330	2,992	5,320
6.2	84.51	338	761	1,352	3,042	5,409
6.4	85.87	343	773	1,374	3,091	5,496
6.6	87.19	349	785	1,395	3,139	5,580
6.8	88.48	354	796	1,416	3,185	5,663
7.0	89.80	359	808	1,437	3,233	5,747
7.2	91.06	364	820	1,457	3,278	5,828
7.4	92.32	369	831	1,477	3,324	5,908
7.6	93.54	374	842	1,497	3,367	5,987
7.8	94.76	379	853	1,516	3,411	6,065
8.0	95.98	384	864	1,536	3,455	6,142
8.2	97.17	389	875	1,555	3,498	6,219
8.4	98.39	394	886	1,574	3,542	6,297
8.6	99.51	398	896	1,592	3,582	6,369
8.8	100.66	403	906	1,611	3,624	6,442
9.0	101.82	407	916	1,629	3,666	6,516
9.2	102.94	412	926	1,647	3,706	6,588
9.4	104.02	416	936	1,664	3,745	6,657
9.6	105.14	421	946	1,682	3,785	6,729
9.8	106.23	425	956	1,700	3,824	6,799
10.0	107.32	429	966	1,717	3,864	6,868
10.2	108.4	434	976	1,734	3,902	6,938
10.4	109.5	438	986	1,752	3,942	7,008
10.6	110.5	442	995	1,768	3,978	7,072
10.8	111.5	446	1,004	1,784	4,014	7,136
11.0	112.5	450	1,013	1,800	4,050	7,200
11.2	113.6	454	1,022	1,818	4,090	7,270
11.4	114.6	458	1,031	1,834	4,126	7,334
11.6	115.6	462	1,040	1,850	4,162	7,398
11.8	116.6	466	1,049	1,866	4,198	7,462
12.0	117.6	470	1,058	1,882	4,234	7,526
12.2	118.6	474	1,067	1,898	4,270	7,590
12.4	119.5	478	1,076	1,912	4,302	7,648
12.6	120.5	482	1,085	1,928	4,338	7,712
12.8	121.4	486	1,093	1,942	4,370	7,770
13.0	122.4	490	1,102	1,958	4,406	7,834
13.2	123.3	493	1,110	1,973	4,439	7,891
13.4	124.3	497	1,119	1,989	4,475	7,955
13.6	125.2	501	1,127	2,003	4,507	8,013
13.8	126.1	504	1,135	2,018	4,540	8,070
14.0	127.0	508	1,143	2,032	4,572	8,128
14.2	127.9	512	1,151	2,046	4,604	8,186
14.4	128.8	515	1,159	2,061	4,637	8,243
14.6	129.7	519	1,167	2,075	4,669	8,301
14.8	130.6	522	1,175	2,090	4,702	8,358
15.0	131.4	526	1,183	2,102	4,730	8,410
15.2	132.3	529	1,191	2,117	4,763	8,467
15.4	133.2	533	1,199	2,131	4,795	8,525
15.6	134.1	536	1,207	2,146	4,828	8,582
15.8	134.9	540	1,214	2,158	4,856	8,634
16.0	135.8	543	1,222	2,173	4,889	8,691
16.2	136.6	546	1,229	2,186	4,918	8,742
16.4	137.5	550	1,238	2,200	4,950	8,800
16.6	138.3	553	1,245	2,213	4,979	8,851
16.8	139.1	556	1,252	2,226	5,008	8,902
17.0	139.9	560	1,259	2,238	5,036	8,954
17.2	140.7	563	1,266	2,251	5,065	9,005
17.4	141.6	566	1,274	2,266	5,098	9,062
17.6	142.4	570	1,282	2,278	5,126	9,114
17.8	143.2	573	1,289	2,291	5,155	9,165
18.0	144.0	576	1,296	2,304	5,184	9,216
18.2	144.8	579	1,303	2,317	5,213	9,267
18.4	145.6	582	1,310	2,330	5,242	9,318
18.6	146.4	586	1,318	2,342	5,270	9,370
18.8	147.2	589	1,325	2,355	5,299	9,421
19.0	147.9	592	1,331	2,366	5,324	9,466
19.2	148.8	595	1,339	2,381	5,357	9,523
19.4	149.5	598	1,346	2,392	5,382	9,568
19.6	150.3	601	1,353	2,405	5,411	9,619
19.8	151.0	604	1,359	2,416	5,436	9,664
20.0	151.8	607	1,366	2,429	5,465	9,715
20.5	153.6	614	1,382	2,458	5,530	9,830
21.0	155.5	622	1,400	2,488	5,398	9,952
21.5	157.4	630	1,417	2,518	5,666	10,074
22.0	159.2	637	1,433	2,547	5,731	10,189
22.5	161.0	644	1,449	2,576	5,796	10,304
23.0	162.7	651	1,464	2,603	5,857	10,413
23.5	164.5	658	1,481	2,632	5,922	10,528
24.0	166.3	665	1,497	2,661	5,987	10,643
24.5	168.0	672	1,512	2,688	6,048	10,752
25.0	169.7	678	1,526	2,712	6,102	10,848
25.5	171.4	686	1,543	2,742	6,170	10,970
26.0	173.1	692	1,558	2,770	6,232	11,078
26.5	174.7	699	1,572	2,795	6,289	11,181
27.0	176.4	706	1,588	2,822	6,350	11,290
27.5	178.0	712	1,602	2,848	6,408	11,392
28.0	179.6	718	1,616	2,874	6,466	11,494

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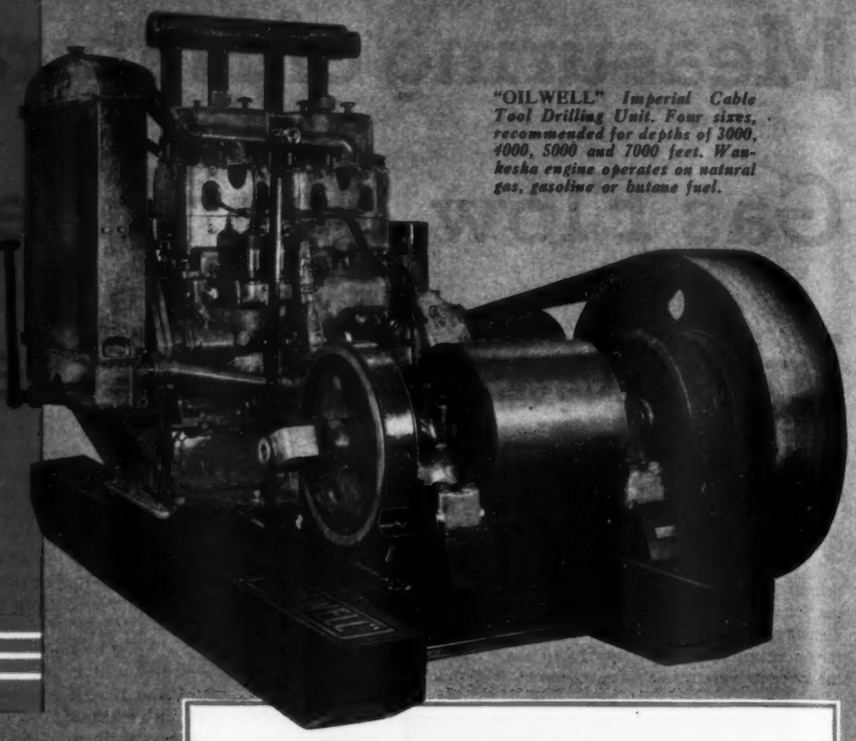

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TABLE 2

Impact pressure, mercury inches	Inside diameter of pipe—inches: 1	2	3	4	6	8
	Delivery rates—1,000 cubic feet per day					
0.1	39.60	197	444	790	1,777	3,159
0.2	56.00	224	504	895	2,015	3,581
0.3	68.58	274	617	1,096	2,466	4,384
0.4	79.21	317	712	1,266	2,849	5,066
0.5	88.55	354	797	1,416	3,187	5,665
0.6	97.00	388	873	1,553	3,494	6,211
0.7	104.7	419	942	1,675	3,769	6,701
0.8	112.0	448	1,008	1,792	4,032	7,168
0.9	118.8	475	1,069	1,901	4,277	7,603
1.0	125.2	501	1,127	2,003	4,507	8,013
1.1	131.3	525	1,182	2,101	4,727	8,403
1.2	137.1	548	1,234	2,194	4,936	8,774
1.3	142.6	570	1,283	2,282	5,134	9,126
1.4	148.1	592	1,333	2,370	5,332	9,478
1.5	153.3	613	1,380	2,453	5,519	9,811
1.6	158.3	633	1,425	2,533	5,699	10,131
1.7	163.2	653	1,469	2,611	5,875	10,445
1.8	168.0	672	1,512	2,688	6,048	10,752
1.9	172.6	690	1,553	2,762	6,214	11,046
2.0	177.0	708	1,593	2,832	6,372	11,328
2.2	185.6	742	1,670	2,970	6,682	11,878
2.4	193.7	775	1,743	3,099	6,973	12,397
2.6	201.6	806	1,814	3,226	7,258	12,902
2.8	209.4	838	1,885	3,350	7,538	13,402
3.0	216.8	867	1,951	3,469	7,805	13,875
3.2	223.9	896	2,015	3,582	8,060	14,330
3.4	230.7	923	2,076	3,691	8,305	14,765
3.6	237.5	950	2,138	3,800	8,550	15,200
3.8	244.0	976	2,196	3,904	8,784	15,616
4.0	250.4	1,002	2,254	4,006	9,014	16,026
4.2	256.6	1,026	2,309	4,106	9,238	16,422
4.4	262.6	1,050	2,363	4,202	9,454	16,806
4.6	268.6	1,074	2,417	4,298	9,670	17,190
4.8	274.4	1,098	2,470	4,390	9,878	17,562
5.0	280.0	1,120	2,520	4,480	10,080	17,920
5.2	285.5	1,142	2,570	4,568	10,278	18,272
5.4	291.0	1,164	2,619	4,656	10,476	18,624
5.6	296.3	1,185	2,667	4,741	10,667	18,963
5.8	301.6	1,206	2,714	4,826	10,858	19,302
6.0	306.7	1,227	2,760	4,907	11,041	19,629
6.2	311.8	1,247	2,806	4,989	11,225	19,955
6.4	316.8	1,262	2,851	5,069	11,405	20,275
6.6	321.7	1,287	2,895	5,147	11,581	20,589
6.8	326.5	1,306	2,939	5,224	11,754	20,896
7.0	331.4	1,326	2,983	5,302	11,930	21,210
7.2	336.0	1,344	3,024	5,376	12,096	21,504
7.4	340.6	1,362	3,065	5,450	12,262	21,798
7.6	345.1	1,380	3,106	5,522	12,424	22,086
7.8	349.6	1,398	3,146	5,594	12,586	22,374
8.0	354.2	1,417	3,188	5,667	12,751	22,669
8.2	358.5	1,434	3,227	5,736	12,906	22,944
8.4	363.0	1,452	3,267	5,808	13,068	23,232
8.6	367.2	1,469	3,305	5,875	13,219	23,501
8.8	371.4	1,486	3,343	5,942	13,370	23,770
9.0	375.7	1,503	3,381	6,011	13,525	24,045
9.2	279.8	1,519	3,418	6,077	13,673	24,307
9.4	383.8	1,535	3,454	6,141	13,817	24,563
9.6	388.0	1,552	3,492	6,208	13,968	24,832
9.8	392.0	1,568	3,528	6,272	14,112	25,088
10.0	396.0	1,584	3,564	6,336	14,256	25,344
10.2	399.9	1,600	3,599	6,398	14,396	25,594
10.4	403.9	1,616	3,635	6,462	14,540	25,850
10.6	407.8	1,631	3,670	6,525	14,681	26,099
10.8	411.5	1,646	3,704	6,584	14,814	26,336
11.0	415.4	1,662	3,739	6,646	14,954	26,586
11.2	419.1	1,676	3,772	6,706	15,088	26,822
11.4	422.9	1,692	3,806	6,766	15,224	27,066
11.6	426.5	1,706	3,839	6,824	15,354	27,296
11.8	430.2	1,721	3,872	6,883	15,487	27,533
12.0	433.8	1,735	3,904	6,941	15,617	27,763
12.2	437.4	1,750	3,937	6,998	15,746	27,994
12.4	441.1	1,764	3,970	7,058	15,880	28,230
12.6	444.6	1,778	4,001	7,114	16,006	28,454
12.8	448.1	1,792	4,033	7,170	16,132	28,678
13.0	451.6	1,806	4,064	7,226	16,258	28,902
13.2	455.1	1,820	4,096	7,282	16,384	29,126
13.4	458.5	1,834	4,126	7,336	16,506	29,344
13.6	461.9	1,848	4,157	7,390	16,628	29,562
13.8	465.2	1,861	4,187	7,443	16,747	29,773
14.0	468.6	1,874	4,217	7,498	16,870	29,990
14.2	471.9	1,888	4,247	7,550	16,988	30,202
14.4	475.3	1,901	4,278	7,605	17,111	30,419
14.6	478.6	1,914	4,307	7,658	17,230	30,630
14.8	481.8	1,927	4,336	7,709	17,345	30,835
15.0	485.0	1,940	4,365	7,760	17,460	31,040
15.2	488.3	1,953	4,395	7,813	17,579	31,251
15.4	491.4	1,966	4,423	7,862	17,690	31,450
15.6	494.7	1,979	4,452	7,915	17,809	31,661
15.8	497.8	1,991	4,480	7,965	17,920	31,859
16.0	500.9	2,004	4,508	8,014	18,032	32,058
16.2	504.2	2,017	4,538	8,067	18,151	32,269
16.4	507.2	2,029	4,565	8,115	18,259	32,461
16.6	510.3	2,041	4,593	8,165	18,371	32,659
16.8	513.3	2,053	4,620	8,213	18,479	32,851
17.0	516.3	2,065	4,647	8,261	18,587	33,043
17.2	519.3	2,077	4,674	8,309	18,695	33,235
17.4	522.3	2,089	4,701	8,357	18,803	33,427
17.6	525.3	2,101	4,728	8,405	18,911	33,619
17.8	528.4	2,114	4,756	8,454	19,022	33,818
18.0	531.4	2,126	4,783	8,502	19,130	34,010
18.2	534.2	2,137	4,808	8,547	19,231	34,189
18.4	537.2	2,149	4,835	8,595	19,399	34,381
18.6	540.1	2,160	4,861	8,642	19,444	34,566
18.8	543.1	2,172	4,888	8,690	19,552	34,758
19.0	545.8	2,183	4,912	8,733	19,649	34,931
19.2	548.9	2,196	4,940	8,782	19,760	35,130
19.4	551.6	2,206	4,964	8,826	19,858	35,302
19.6	554.4	2,218	4,990	8,870	19,958	35,482
19.8	557.3	2,229	5,016	8,917	20,063	35,667
20.0	560.0	2,240	5,040	8,960	20,160	35,840
20.5	566.9	2,268	5,102	9,070	20,408	36,282
21.0	573.9	2,296	5,165	9,182	20,660	36,730
21.5	580.7	2,323	5,226	9,291	20,905	37,165
22.0	587.3	2,349	5,286	9,397	21,143	37,587
22.5	594.1	2,376	5,347	9,506	21,388	38,022
23.0	600.6	2,402	5,405	9,610	21,622	38,438
23.5	607.1	2,428	5,464	9,714	21,856	38,854
24.0	613.5	2,454	5,522	9,816	22,086	39,264
24.5	619.9	2,480	5,579	9,918	22,316	39,674
25.0	626.2	2,505	5,636	10,019	22,543	40,077
25.5	632.4	2,530	5,692	10,118	22,766	40,474
26.0	638.6	2,554	5,747	10,218	22,990	40,870
26.5	644.7	2,579	5,802	10,315	23,209	41,261
27.0	650.7	2,603	5,856	10,411	23,425	41,645
27.5	656.8	2,627	5,911	10,509	23,645	42,035
28.0	662.7	2,651	5,964	10,603	23,857	42,413

TABLE 4

Fraction	Decimal equivalent	Squares of diameters—Inside diameter—inches: 1	2	3	4	5	6	7	8	9	10
0		1	4	9	16	25	36	49	64	81	100
1/16	.0625	1.129	4.254	9.378	16.504	25.629	36.754	49.878	65.004	82.129	101.254
1/8	.1250	1.265	4.515	9.765	17.015	26.265	37.515	50.765	66.015	83.265	102.516
3/16	.1875	1.410	4.785	10.160	17.535	26.910	38.285	51.660	67.035	84.410	103.785
1/4	.2500	1.562	5.062	10.562	18.062	27.562	39.062	52.562	68.062	85.562	105.062
5/16	.3125	1.722	5.347	10.972	18.597	28.222	39.847	53.472	69.097	86.722	106.347
3/8	.3750	1.890	5.640	11.390	19.410	28.890	40.640	54.390	70.140	87.890	107.640
7/16	.4375	2.066	5.941	11.816	19.691	29.566	41.441	55.316	71.191	89.066	108.941
1/2	.5000	2.250	6.250	12.250	20.250	30.250	42.250	56.250	72.250	90.250	110.250
9/16	.5625	2.441	6.566	12.691	20,816	30.941	43.066	57.191	73.316	91.441	111.566
5/8	.6250	2.640	6.890	13.140	21.390	31.640	43.890	58.140	74.390	92.640	112.890
11/16	.6875	2.847	7.222	13.597	21.972	32.345	44.722	59.097	75.472	93.847	114.222
3/4	.7500	3.062	7.562	14.062	22.562	33.062	45.562	60.062	76.562	95.062	115.562
13/16	.8125	3.285	7.910	14.535	23.160	33.785	46.410	61.035	77.660	96.285	116.910
7/8	.8750	3.515	8.265	15.015	23.765	34.515	47.265	62.015	78.765	97.515	118.265
15/16	.9375	3.753	8,628	15.503	24.378	35.253	48.128	63.003	79.878	98.753	119.628

fittings that would cause turbulence in flow need govern the location. Figure 1 shows a one-half inch collar welded into a 4-inch vent line with a short nipple and valve screwed into the collar. A hole one-half inch in diameter threaded to receive a flat plug would serve the same purpose, although under considerable pressure, the flat plug, in its final stage of removal might be blown out with sufficient force to cause personal injury. Pressure can be relieved by opening the one-half inch valve, preferably a gate valve, and the nipple and valve may be removed intact without danger of accident. Any fitting left permanently on the vent line must be close enough to the pipe to permit the bend in the pitot tube to enter the vent line.

The pitot tube used consists of a one-eighth inch copper tube, the tip of which is placed in the vent

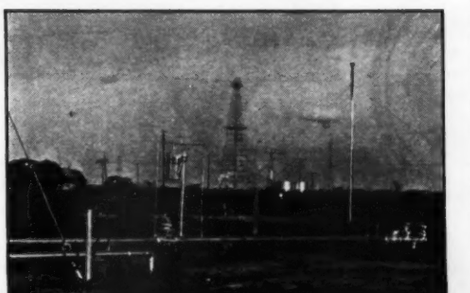


Fig. 3—Relative position of the differential pressure on the vent line

line at the center of the pipe, pointing upstream to record the impact pressure. The other end is connected by rubber hose to one side of the manometer. The static pressure is obtained between the one-eighth inch copper tubing and the one-quarter inch connections connected to the other side of the manometer by a rubber hose. The copper tubing slides through the one-quarter inch fittings to permit the tip of the pitot tube to be placed in the center of the pipe. A stuffing box prevents loss of static pressure outside the pitot tube. Figure 2 shows the pitot tube and manometer connected up to obtain the differential pressure. Figure 3 shows the relative position of the differential pressure connection on the vent line, the vent line flare and the gas meter on the line flowing the gas which is used.

TABLE 3

Impact pressure pounds, per sq. inch	Inside diameter of pipe—inches: 1	2	3	4	6	8
	Delivery rates—1,000 cubic feet per day					
0.5	126.3	505	1,137	2,021	4,547	8,083
1.0	178.7	715	1,608	2,859	6,433	11,437
1.5	218.8	875	1,969	3,501	7,877	14,003
2.0	252.6	1,010	2,273	4,042	9,094	16,166
2.5	282.4	1,130	2,542	4,518	10,166	18,074
3.0	309.4	1,238	2,785	4,950	11,138	19,802
3.5	334.3	1,337	3,009	4,680	12,035	21,395
4.0	357.3	1,429	3,216	5,717	12,863	22,867
4.5	378.9	1,516	3,410	6,062	13,640	24,250
5.0	399.5	1,598	3,596	6,392	14,382	25,568
5.5	418.9	1,676	3,770	6,702	15,080	26,810
6.0	437.5	1,750	3,938	7,000	15,750	28,000
6.5	455.6	1,782	4,010	7,130	16,042	28,518
7.0	472.7	1,891	4,254	7,563	17,017	30,253
7.5	489.3	1,957	4,404	7,829	17,615	31,315
8.0	505.2	2,021	4,547	8,083	18,187	32,333
8.5	520.8	2,604	4,687	8,333	18,749	33,331
9.0	536.0	2,144	4,824	8,576	19,296	34,304
9.5	550.6	2,753	4,955	8,810	19,822	35,238
10.0	564.9	2,260	5,084	9,038	20,336	36,154
10.5	578.8	2,315	5,209	9,261	20,837	37,043
11.0	592.6	2,370	5,333	9,482	21,334	37,926
11.5	605.6	2,422	5,450	9,690	21,802	38,758
12.0	618.8	2,475	5,569	9,901	22,277	39,603
12.5	631.5	2,526	5,684	10,104	22,734	40,416
13.0	644.2	2,577	5,798	10,307	23,191	41,229
13.5	656.4	2,626	5,908	10,502	23,630	42,010
14.0	668.5	2,674	6,017	10,696	24,066	42,784

Rocky Mountain Oils Analyzed By Bureau of Mines

Twelve crude oils from 10 new fields and new producing horizons in oil fields in the Rocky Mountain region have recently been analyzed by the Bureau of Mines, U. S. Department of the Interior. The discovery of these fields is the result of intensive search during the last few years to augment present supplies of light oil. The analyses were made by the Bureau of Mines Hempel method, and production data and a brief history of each field are given in a report just published.

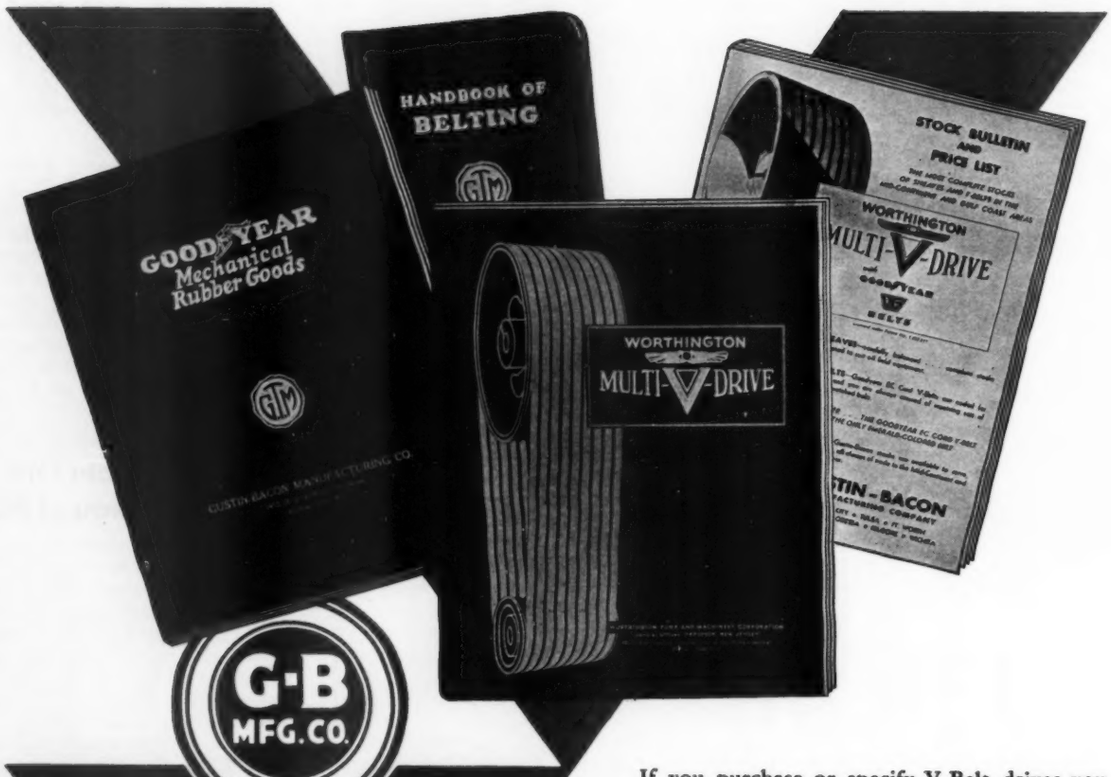
The Cut Bank field in Glacier County and the Pondera field in Pondera County, northwestern Montana, both produce intermediate base, wax-bearing crude oils of 37.0° and 31.9° A.P.I. gravity, respectively. The Pondera oil is similar to that of Cut Bank in basic characteristics; however, it contains less gasoline and naphtha and more sulfur and asphalt than the Cut Bank crude oil.

The crude oils produced from the Sundance sands in the Medicine Bow and Rock Creek fields, Carbon County, and the Lance Creek field, Niobrara County, Wyoming, are similar in basic characteristics although they differ considerably in gravity and gasoline and naphtha content. Their A.P.I. gravities are: Medicine Bow, 63.4°; Rock Creek, 36.0°; Lance Creek, upper Sundance, 42.8°, and Lance Creek, basal Sundance, 49.4° The bases of these crudes are paraffin, paraffin-intermediate, or intermediate with properties falling near the dividing line between the classes.

The crude oil produced from the Dakota sand in the Lance Creek field, which is representative of the production of the field prior to the discovery of oil in the Sundance sands, is of intermediate-paraffin base, wax bearing, and has an A.P.I. gravity of 37.8°. Another Dakota sand field, the Quealy dome, Albany County, Wyoming, produces an intermediate base, wax-bearing oil of 33.2° A.P.I. gravity.

The crude oils produced from the Waugh dome field, Hot Springs County, and the Wertz dome field, Sweetwater County, Wyoming, are intermediate base and wax bearing and because of their high sulfur and asphalt contents are termed "black oils." The Waugh dome oil has an A.P.I. gravity of 27.8° and a sulfur content of 1.77 per cent. The Wertz dome crude oil has a gravity of 35.2° A.P.I. and a sulfur content of 1.3 per cent.

Copies of Bureau of Mines Report of Investigations 3358, Analyses of Crude Oils From Some of the More Recently Discovered Rocky Mountain Fields, by Walter Murphy and H. M. Thorne, may be obtained without charge from the Information Division, Bureau of Mines, Washington, D. C.



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PROBLEMS FROM READERS

Edited by L. G. E. Bignell

Estimated Oil Reserves and Shale Oil Possibilities

I will appreciate it very much if you will advise me on the following points:

1. What is the estimated oil reserves in the United States?

2. In your opinion, to what extent will this oil reserve be increased by deeper drilling and other new fields?

3. What is the estimated recoverable oil content of the bituminous shales that are available for the extraction of oil in the United States?

4. What is the approximate cost per barrel of oil extracted from shale?—W. H. H.

We are now working upon the problem of oil reserves in this and foreign countries and these data will be published in The Oil and Gas Journal as soon after January 1, 1938, as available.

Our last year's estimate placed the reserves of this country at about 12,500,000,000 bbls.

We have not been finding oil at a much higher rate than we have been producing it and this year we estimate the demand will exceed 1,276,000,000 bbls. If new areas for prospecting are developed the new oil reserves might be increased appreciably and we are going to publish an article on this subject in an early issue of The Oil and Gas Journal and suggest you read it.

The question about recoverable oil from oil shales is a very difficult one to answer because it is essentially one of economics and not one of volume of shales available for it is almost unlimited.

In treating oil shales to recover oil several by-products can be recovered also and if the market for those by-products can be established the cost of producing the shale oil would be correspondingly reduced. If the plants were to run for oil extraction alone the cost of installation of the equipment for mining and treating the shale has been estimated as equal to the sum already invested in the oil industry if the volume of oil to be obtained is to be large enough to replace the present crude oil demand.

You will find much of interest concerning oil-shale plants in Bulletin 315, U. S. Bureau of Mines, which may be obtained from the U. S. Government Printing Office, Washington, D. C., for 70 cents per copy if still in print.

Market for Carbon Dioxide

From a short article published in the Tampa, Fla., "Tribune" I learn that two Pueblo, Colo., men struck "ice" in a well drilled near Bueyeros, Harding County, New Mexico, and it is estimated this well will make from 25,000,000 to 40,000,000 cubic feet of carbon dioxide per day. My husband and I own 320 acres of land in Union County, New Mexico, near Clayton, and learned recently of some prospecting in that vicinity which is conceded to be a potential oil or gas area. Any information you can give us concerning the well, the value of the product, its uses and so forth, will be greatly appreciated.—Mrs. C. E. H.

In reply to your letter asking about a well in northeastern New Mexico we are obliged to advise that we know no more than the clipping states.

It is not customary for the oil scouts covering the oil field activities in the southeastern part of that state to attempt to follow the drilling of gas wells in the northeastern section. There has been a considerable number of those gas wells drilled in Union and Harding counties and the owners hope to develop a commercial market for the carbon dioxide but to date not much has been accomplished.

If you will write to Dr. E. H. Wells, president, New Mexico School of Mines, Socorro, N. Mex., he can send you some literature about carbon dioxide development in New Mexico and from it you may learn something of interest to you.

While it is quite probable some use will be developed for carbon dioxide, which is used for making the so-called "dry ice," it is going to take time for this to be accomplished. In the meantime there is no great demand for land under which this gas may be found because there is already a large reserve developed in New Mexico and other western states.

To make dry ice the gas has to be treated and processed and the plant and equipment for such treating and processing costs considerable and as the market for the product is at present rather limited new plants are not being erected. There is a definite desire upon the part of state officials in New Mexico to find commercial outlets for the dry ice but it will take time to develop them.

Overcoming Lost Circulation in Drilling Well

We have encountered serious difficulties when crossing a fault crevice in one of our drilling jobs which were overcome under heavy loss of time and additional expense. The trouble was that we lost returns altogether and had to drill a zone of 40 to 50 feet of fractured formation without returns before setting casing. What is the best method of crossing a fault, the conditions being similar to those in the Balcones fault zone of Texas?—E. H. G.

The answer to your question will be found in the use of fiber-impregnated mud or cement which has been developed recently and is now available from several of the leading cement companies. You are referred to an article about this material and its use written by Harold K. Ihrig and printed in the May 21, 1936, issue of The Oil and Gas Journal, page 98.

This method of plugging open spaces into which mud has been lost is based upon the principle of mixing with the mud or the cement a long fiber, usually shredded sugar cane, and permitting this mud or cement to enter the open space. It has been found it will quickly close the opening and restore circulation. The length of the fiber is variable and should be selected with some knowledge of the problem but the manufacturers of the cement can give this information when given the details of the problem.

The Dewey Portland Cement Co., Kansas City, Mo., and the O. K. Cement Co., Oklahoma City, Okla., manufacture the fiber cement. Either of these companies will be glad to give you information about your problem if you care to submit it to them.

Tracing a Fault by Geophysical Methods

Is any of the known geophysical methods apt to give a clear picture of the trend of a fault? We have such a fault which is clearly proven by drilling, on a block in the Balcones fault of Texas, but want to make sure about its continuation. If any of the methods can show this, which one is it and who is operating it?—E. H. G.

It is possible to trace a fault zone by applied seismograph methods because a change in the relative position of markers on each side of the fault will permit the zone of movement to be mapped. It is also possible to trace faults by the use of the electrical resistivity surveying method. It is also possible that careful work with other applied geophysical methods will secure data from which it would be possible to detect fault areas.

In any type of this work it is quite essential that the geophysicists work with a competent geologist familiar with the area because it is a matter of interpretation of data secured by the field crews that will permit the mapping of the fault zone. A great deal of care must be exercised in the office in mapping and interpretation and any of the geophysical companies are qualified to do this work if given time and opportunity to carry on in the approved manner. You will find several of the geophysical companies advertise in The Oil and Gas Journal.

Rating of Gas Heaters

I note an advertisement in the morning paper reading: "Attractive gas cabinet heater, 30,000 B.t.u." Just what does the rating signify?—B. H.

The B.t.u. stands for British thermal unit generally used in engineering work in the United States and Great Britain and is 1/180 of the heat required to raise the temperature of 1 pound of water from 32° F. to 212° F. It was formerly defined as the quantity of heat required to raise the temperature of 1 pound of water from 62 to 63° F., but the former definition is now generally accepted.

The heater rating means the capacity of the unit to deliver 30,000 B.t.u. per hour and can be reduced to volume of gas required by dividing the 30,000 by the B.t.u. per cubic foot of natural gas which has an average of about 1,100 B.t.u.

In this instance the heater in question is capable of consuming about $30{,}000 \div 1{,}100 = 27.25$ cubic feet of gas per hour of average natural gas. Or another way of stating it is to say that it would be necessary to burn 27.25 cubic feet of natural gas containing at least 1,100 B.t.u. per cubic foot per hour to deliver 30,000 B.t.u. of heat into the room.

The rating of all heating units using gas for fuel is established by the American Gas Association, laboratory, Cleveland, Ohio, and they take into consideration several factors in making these ratings. The gas is under 2 ounce pressure and there are other controlled factors. If you desire details it is suggested you write the laboratory and ask them for one of their instruction booklets covering heating units.

QUESTIONS ON TECHNOLOGY

By Charles K. Francis, Ph.D., Technical Editor

Temperature Rises and Falls When Making Charcoal Test

Would you please advise where I could secure information as to the method of conducting charcoal heat absorption tests? In making this test to determine the gasoline content of a gas the time the gas is passed through the charcoal is governed by a series of rises and falls of the temperature of the gas leaving the charcoal tube, not by the number of cubic feet passed.—H. C.

The determination of the gasoline content of natural gas by the charcoal method is based upon the adsorptive property of activated charcoal. During the process some heat is developed but the temperature rise, together with other conditions surrounding does not appear to be sensitive enough to permit an interpretation in terms of gasoline content of a gas. The maximum rate of flow of gas through the charcoal tube should not exceed 15 cubic feet per hour and a single test is usually completed within 20 minutes, which means that except for very lean gas, the test will be completed within a run of 5 cubic feet. Quoting from the description of the test method:

"The rate of flow shall be sufficient to give four distinct temperature rises. Experience has shown that the proper saturation of the charcoal may always be obtained when rates are controlled to give distinct temperature rises in the charcoal, regardless of the richness of the gas. In general, it should be remembered that rich gases must be run at a slower rate than lean gases. It is inadvisable to run any gas at a rate greater than 15 cubic feet per hour. When saturating charcoal by this procedure it will be noted that the meter will not indicate flow during the first few seconds as the total volume of gas passing into the tube is being adsorbed by the charcoal. Until experience has been gained, the rate of flow should be rather slow until the first temperature rise has occurred and the meter indicates a flow of gas. The rate may be gradually adjusted as found necessary. However, the final adjustment must not be made after the temperature has definitely started to drop from the third rise.

"The indicator for the charcoal test is the thermometer at the top of the charcoal tube. As the test progresses it will be observed that the temperature alternately rises and falls. The rate must be so selected that each rise can be definitely distinguished. When the gas is passed through the charcoal at too fast a rate the rises merge and cannot be separated, and when the rate is too slow the fourth rise cannot be detected. It is this fourth rise that marks the termination of the test and when it approaches, frequent observations of the thermometer must be made. When the temperature has dropped one-half degree Fahrenheit after the top of the fourth rise has been reached, the charcoal has been saturated and the test is discontinued. It will be noted that the rises and falls are definite and cover several degrees, and small fluctuations due to atmospheric changes are to be disregarded. Change in the gas rate will also cause a temperature change, hence the rate should not be altered after the third rise, as noted above.

"When the fourth rise has been reached, first shut the rate valve at the top of the tube, then the rate valve at the bottom of the charcoal tube. When the meter index hand stops moving, record this reading as the gas metered. The temperature of the gas is obtained by averaging readings of the thermometer on the meter taken at four equal intervals during the course of the test. The first reading shall not be taken until the meter has indicated at least two-tenths (0.2) of a cubic foot. To obtain reliable temperatures, the meter must be shaded."

It is frequently true that the first three temperature rises are quite rapid, being completed when 1.5 to 1.75 cubic feet have passed, but the last one may be slow, being observed between 3.5 to 4 cubic feet under the conditions of test.

References: California Natural Gasoline Association, Bull. TS-351. Natural Gasoline Association of America, Tulsa, Okla., Standard Methods.

Petroleum Products and Their Value as Produced in 1935

Can you furnish a list of the products that are obtained from the crude oils of the United States? If possible to obtain it the value of these products would be appreciated.—N. H. E.

A complete list of all products that are being made from petroleum in the refineries of the United States is not available. The table presented may be considered as showing the primary or major products produced in one year, 1935 being the latest year for which the data are compiled.

PETROLEUM PRODUCTS PRODUCED IN 1935

	Quantity*	Value†
Light products of distillation, total	18,766,015	1,039,388
Gasoline	18,505,867	1,023,588
Naphtha	216,906	13,223
Benzine	43,241	2,577
Illuminating oils	2,194,731	94,179
Fuel oils	15,905,206	359,437
Partly-refined oil sold for re-running	1,042,276	31,658
Lubricating oils	1,274,384	186,534
Liquid asphaltic road oil	406,968	13,346
Greases	49,919	12,740
Paraffin wax	61,201	11,001
Acid oil	64,664	827
Asphalt, other than liquid asphalt	‡1,962	20,820
Petroleum coke	‡1,442	5,757
Other refinery products	.....	54,708
Total	.....	1,830,394

*Thousands of gallons unless otherwise noted. †Thousands of dollars. ‡Thousands of short tons.

Reference: Arranged by the American Petroleum Institute from data of the U. S. Bureau of the Census.

CHEMICALS FOR THE PETROLEUM INDUSTRY

Activated Charcoal

Use—Adsorbing agent for extracting gasoline from gas.

Form—Solid particles, essentially carbon.

Source—Cocoanut shells.

Activated by—Superheated steam.

LIMITATIONS

Size, mesh	Between 8 and 14
Through 14 mesh	Under 5 per cent
Activity, min.	45 minutes

Note. After each use it must be screened and all passing 14 mesh discarded. For details of the charcoal test method for determination of gasoline in natural gas, see Bull. No. TS-351, California Natural Gasoline Association.

Analyses of Oil From Miller County or Arkansas Section of Rodessa

Please send me information on the quality of the oil produced in the Capps area of Miller County, Arkansas. I would also like to have the distillation or analyses of same and information as to whether gasoline and kerosene made from that crude will meet sulfur, doctor and corrosion specifications without treatment.—T. C. M.

The oil from the Arkansas portion of the Rodessa field is similar to other Rodessa oil. The gravity is high, sulfur content is low and like other paraffin base oils yields a S.R. gasoline having a low-octane rating.

ANALYSES OF MILLER COUNTY, ARKANSAS NO. 1 CAPPS OIL

Gravity, A.P.I.		41.0
Sulfur, per cent		0.36
Viscosity at 100° F.		47
Pourpoint, °F.		0
B.S.&W., per cent		0.1
Base		Paraffin
Color		Black-green
Distillation		(28-in. vacuum)
Products—		Per cent
Gasoline		23.0
Gravity, A.P.I.	62.7	
I.B.P., °F.	123	
10 per cent	186	
50 per cent	262	
90 per cent	345	
95 per cent	360	
Octane No.	36	
Corrosion, doctor and S., O.K.		
Kerosene		19.5
Gravity	47.0	
Color	30	
Gas oil		50.0
Gravity	33.4	
Flash, °F.	305	
Residue		6.5
Gravity	11.2	

The very low octane rating suggests an operation to produce less gasoline, to increase octane rating, and increase the yield of kerosene to bring it within the naphtha range. The economical refining of an oil of this type requires that cracking be included.

Quality of Gasoline From Lisbon, Louisiana, Crude Oil

In the issue of December 9, 1937, you gave an analysis of Lisbon crude oil, showing the gasoline to have an octane number of 41.5. Can this gasoline be treated with lead to bring it up to market requirements for octane value?—E. D.

The S.R. gasoline reported in the analysis mentioned is remarkable in several respects. The tetraethyl lead requirement is known to be high, about 3 to 3.5 cc. being required to bring the 400 endpoint product up to 70 octane rating. The gasoline is negative to the corrosion test and sweet to doctor test. The sulfur content is below the sulfur specification of 0.1 per cent. The A.P.I. gravity of the gasoline is exceptionally high.

Since the treatment with ethyl lead would be expensive, an economical operation would be to reduce the endpoint of the gasoline for increasing the octane value. This makes less gasoline but increases the volume of kerosene, which should be of exceptionally high quality. Reducing the gasoline yield by 8 to 10 per cent would increase the octane number to about 52 and then require something like 1.5 cc. of lead per gallon to bring the gasoline to the 70 octane number requirement.

Oil Fields of the U.S.S.R.—

Geology and Productiveness

By WILLIAM J. KEMNITZER

Caucasus Region

The Caucasus region includes the districts of Azerbaidjan, Northeast Caucasus, Kuban and Azov-Black Sea, and Georgia. Azerbaidjan lies at the southeastern terminus of the Caucasus Range on the western shores of the Caspian Sea; the Northeast Caucasus district lies on the northeastern slopes of the Main Caucasus in Chechenian Ingushetian A.S.S.R. and southern Daghestan; the Kuban and Azov-Black Sea district lies on the northwestern slopes of the Caucasus, southeast of the Sea of Azov; the Georgia district lies south of the Main Caucasus, and eastward from the Black Sea to beyond Tiflis in Georgian A.S.S.R.

The Azerbaidjan district is the most important in the Caucasus. It accounts for nearly 83 per cent of the present output of crude oil in the region; possesses 75 per cent of the proved reserves, and 81 per cent of the possible reserves. About 30 per cent of the exploratory work of the region is being carried on in this district. Following in order of largest possible reserves are the Northeast Caucasus, Georgia, and Kuban and Black Sea districts.

Despite the variances in production and reserves among these districts they have a geology broadly in common. All produce oil and gas from Tertiary "sands" involved mainly in anticlinal structures closely related to the orogenesis of the Caucasus. From developments to date it appears that the western part of the Aberzaidjan district is directly connected with the oil fields of Georgia to the west and with those of Daghestan to the north, thus forming a continuous series of oil fields surrounding the Caucasus.

Azerbaidjan District

This district includes the areas of the Apsheron Peninsula in the extreme east; Kabristan to the west and south of the Apsheron Peninsula; the Kura Plain southwest of the Kabristan area in the wide valley of the Kura River; and the Caspian area northwest of the Apsheron Peninsula along the coast of the Caspian Sea. Production is concentrated on the Apsheron Peninsula. From the Apsheron Peninsula prospecting is extending westward to Kabristan and southwestward to the Kura Plain (where a large new oil field has recently been discovered), and northwestward along the Caspian Coast.

The productive oil fields of Azerbaidjan are confined almost wholly to Tertiary rocks involved in two major tectonic units, namely, the regional uplift represented by the southeastern plunge of the Main Caucasus Range and the great geosyncline of the Kura Plain and southern Kabristan lying between the Main Caucasus Range and the Small Caucasus to the south. The Apsheron Peninsula describes the most easterly extension of the Main Caucasus uplift.

The Apsheron Peninsula is the most highly developed and productive area in the Azerbaidjan district. It accounts for practically all of the present output of crude oil in the district, holds more than 91 per cent of the proved reserves, but less than 13 per cent of the possible reserves. Kabristan leads in possible reserves with slightly more than 36 per cent, and this is followed by the Kura Plain with 29 per cent and the Caspian area with 23 per cent. The proved reserves of the Azerbaidjan district as a whole amount to 22 per cent of the total reserves; for the Apsheron area, proved reserves amount to nearly 68 per cent of the total.

Apsheron Peninsula—In this area are the most productive oil fields of the U.S.S.R. Petroleum has been known and produced by one means or another in the vicinity of the ancient town of Baku from time immemorial. During 1936 the output of crude oil from this area amounted to about 71 per cent of the total for the U.S.S.R. At present there are 14 fields in this area. Before the revolution, the output was confined to six fields, namely, Balakhany-Sabunchy-Ramany, Surakhany, Bibi Eibat, Binagady, Artem Island (Sviatoi) and Shubany. Since the Revolution, eight new fields have been added, namely, Puta (1925), Kara Chkhur (1928), Kergez (1929), Kala (1932), Lok Batan (1933), Sulu Tepe (1933), Zykh (1935), and Kyzyl (1936). The bulk of the oil comes from four fields: Balakhany-Sabunchy-Ramany, Kala, Bibi Eibat, and Surakhany which together account for about four-fifths of the Apsheron output.

The rocks at the surface over the Apsheron Peninsula are mostly Quaternary sands, gravels, silts, and clays. Tertiary marls, sandstones, and shales are exposed in some of the more uplifted localities, and to the northwest, Cretaceous strata are exposed in the cores of anticlinal folds. The Main Caucasus Range to the northwest of the Apsheron Peninsula has a central core of Archean crystalline schists, gneisses, granites, and other igneous and metamorphic rocks. This basement is flanked or covered by Jurassic strata over which in succession are laid Cretaceous, Tertiary and Quaternary beds. The older rocks are exposed on the higher elevated portion of the Range to the northwest, but in the southeast they lie deeply buried, and over most of the Apsheron Peninsula even the Tertiary beds are obscured by a thick mantle of later alluvium. It is down on this comparatively flat alluvial country, well below the contact of the Tertiary with the Cretaceous, that the most productive oil fields have been developed.

The structure of the sedimentary beds in the oil-bearing areas is well defined in general but complex in detail. Taking into consideration the northwest-southeast trend of the Main Caucasus Range, it is not surprising that the general line of folding beneath the alluvial covered plain of the Apsheron Peninsula is in the same direction. Despite this general tendency of structures to line up with the main regional uplift, locally the anticlines have a marked tendency at branching, and sinuosity. Some of the folds strike due north and south, while others strike east and west, and all are highly faulted, both along the strike and with the dip.

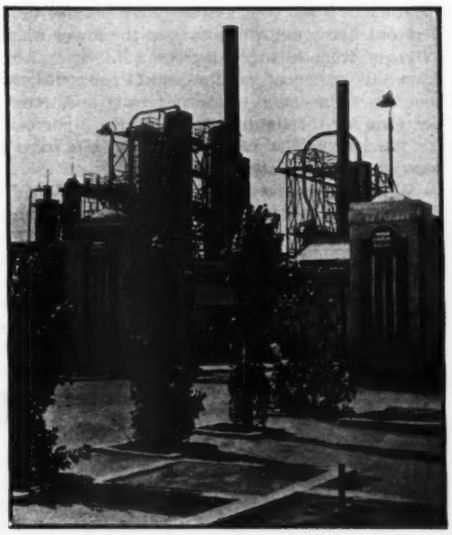
The folding of the Apsheron district has two peculiar characteristics: One is the tendency to branching, virgation, and the formation of ring-shaped folds; and the other is the piercing core or so-called diaper type of fold, with which is associated the cryptodiaper type distinguished by increase of dips and thinning of beds towards the crest. Eastward, in the direction of the Caspian Sea the folding gradually disappears at the surface. Farther to the east and in the Caspian Sea itself is a belt of uplifts consisting of two elliptical brachianticlines whose axes are elongated in a northwest-southeast direction. These form the islands off the eastern end of the Apsheron Peninsula, on one of which a large oil field, Artem, has been developed. Another characteristic of the tectonics of this district is the presence of numerous mud volcanoes and their association with the axial lines of anticlines. It is quite probable that this association depends on the broken (fissured) character of the strata along the crests of the folds.

The commercial oil of the Apsheron Peninsula is found mostly in sands, sandy clays, and diato-

Mr. Kemnitzer's Articles

This is a third installment of Mr. Kemnitzer's article on the oil fields of the U.S.S.R.; their geography, geology and relative productiveness, the first part of which was published in the December 31 International edition and the second part in the January 13 issue.

Mr. Kemnitzer has previously contributed articles in The Oil and Gas Journal on Soviet reserves, August 19 and September 23; Soviet exports and home market, September 30; Refining in U.S.S.R., October 7; Crude oil production in Russia, October 14; and Soviet problem of future reserves, October 28, 1937.



Beautified refinery site

TABLE 3—PRODUCTION AND RESERVES OF CRUDE PETROLEUM IN THE CAUCASUS REGION OF THE U.S.S.R.

	Daily average Output crude 1936		Reserves (Jan. 1, 1937			
			Proved		Possible	
	Bbls.	Per cent	Thous. bbls.	Per cent	Thous. bbls.	Per cent
Azerbaidjan	*426,020	82 9	3,994,900	74 6	13,871,200	81 2
Northeast	65,744	10 8	945,000	17 6	1,300,600	7 6
Georgia	(*)	....	260,400	4 9	973,000	5 7
Kuban and Azov-Black Sea	22,246	4 3	152,600	2 9	945,700	5 5
Total Caucasus region	514,010	100 0	5,352,900	100 0	17,090,500	100 0

*Georgia included with Azerbaidjan (?).

maceous shales of Tertiary age which are dislocated into a series of brachianticlinal folds. The Pliocene is the most productive, but substantial quantities of oil have been developed in Miocene and Oligocene (chiefly Maikop) beds, and still deeper production is expected in the Cretaceous rocks which are known to be oil-bearing where they crop out in the foothills to the northwest.

The main oil-bearing body is a thick sandy zone in the Pliocene, called the "Productive" formation. It has an average range in thickness of from 4,500 to 4,800 feet. At Bibi Eibat, it has been penetrated to a depth of 5,400 feet and 17 productive horizons have been developed. All of these horizons are not, of course, oil-bearing everywhere. At Balakhany-Sabunchy-Ramany, for instance, there are 10 horizons and numerous intermediate sands. Some are dry; some are water-bearing; and still others contain only gas.

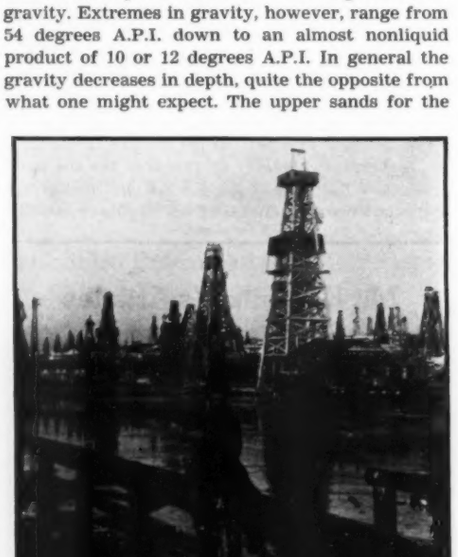
Structure and Lithology

The structure and lithology of the productive formation vary widely. The constituent beds are highly faulted, fractured, and often overthrust and dislocated to a marked degree. The attitude of a structure in these beds at the surface commonly changes in depth and the intra-formation unconformities and changes in lithologic character complicate the accumulation of oil, gas and water both in degree of saturation and relative position. Such variations account in large part for the characteristically eratic output of wells and extraordinary difficulties of exploration, development, and production. The lithology of the productive beds varies from unconsolidated sands, gravels, and pebbles, to hard, fine-grained sandstones and fractured shales. Masses of sand, pebbles, and even boulders, are sometimes ejected from gushers and cause considerable trouble in producing wells.

The origin of the productive formation has been in fresh and brackish waters under delta, desert or continental conditions. Fossils are few, and classifications and correlations are made on the basis of lithology. Westward the beds characteristically thin, but to the east and south they regularly thicken. Distribution is according to a certain "law." Near the core of the mountain massif, oil is associated with the lower horizons, while towards the axial depression it is confined to the younger beds.

The depth of production in the Apsheron area has a wide range. The wells vary from less than 100 feet below the surface to nearly 6,000 feet but the average is probably less than 2,500 feet, and few producing wells are below 3,500 feet. Over the years, there has been a progressive increase in the depth of wells but deep drilling in the sense that is practiced in the United States, is yet unknown in the U.S.S.R. In the beginning about 1821, oil was obtained from hand-dug pits, and as late as 1910 oil was obtained in this manner in the Shubany (Atashka) field. In the 1860s the depth of wells averaged less than 100 feet; in the 1870s about 200 feet; in the 1880s about 500 feet, and at the close of the century less than 1,500 feet. By 1930 the average depth had increased to more than 2,000 feet. The present tendency is toward deeper wells, but the proximity of the undeveloped productive formation to the surface in most localities and the lack of drilling equipment and technique are factors of retardation. There seems little doubt but that from a geological standpoint, vast reserves not evident at the surface lie deeply buried away from the present development.

The quality of oil from the Apsheron fields varies considerably, but in general consists of two grades designated "light" and "heavy." The "light" oils range in gravity from 29 to 40 degrees A.P.I. and the heavy oils from 18 to 24 degrees A.P.I. gravity. Extremes in gravity, however, range from 54 degrees A.P.I. down to an almost nonliquid product of 10 or 12 degrees A.P.I. In general the gravity decreases in depth, quite the opposite from what one might expect. The upper sands for the most part yield the light oil while the lower sands yield the heavy oil. This is true at Balakhany-Sabunchy-Ramany where oil in the upper sands ranges in gravity from 26 to 32 degrees A.P.I. and yield about 9 per cent gasoline and from 30 to 35 per cent kerosene; while that of the lower sands averages from 18 to 26 degrees A.P.I. and yields from 3 to 6 per cent gasoline and 14 per cent kerosene. Paraffin content averages from less than 1 per cent for the lighter oils to nearly 6 per cent for the heavy oils, and some of the oils have a heavy asphaltic content.



Ramaninsky Lake drained for drilling

While the lightest, so-called "white" oil, of 54 degrees A.P.I. gravity comes from the uppermost sands at Surakhany, at other localities the lighter oil, contrary to the rule, comes from deeper sands. This is especially true of the "Diatomaceous" beds which lie below the productive formation. Also, at other localities the gravity of the oil increases in depth, notably in the Puta (Molotov) field where an oil of 36 degrees A.P.I. has been found in the deeper sands; and at Kala, where the gravity also increases with depth. Different conditions of tectonic disturbance and other circumstances of natural distillation associated with volcanic activity probably account for the varying degrees and inconsistencies in the gravities of the oils.

The output of wells in the Apsheron area is also extremely variable. Initial productions range from a few barrels per well per day to many thousands of barrels. The district is noted for its spectacular gushers, some of which have been the largest in the history of petroleum. Flowing wells of 2,000 and 3,000 bbls. daily are not uncommon. In the Kergez-Kyzul field, test wells have come in at the rate of more than 3,000 bbls. per day; at Lok-Baton (Mikoyan) a well yielded 7,000 bbls. per day; and in the Shongar field a deep well recently flowed at the rate of 14,000 bbls. per day. History is replete with accounts of extraordinarily large wells in the Baku area, but average initial productions do not exceed several hundred barrels per day.

Settled Output

The settled output of many wells runs into several hundred barrels per day, but the average daily output per well for the area is estimated at about 80 bbls. which compares with less than 50 bbls. for wells in California and less than 10 bbls. for the United States as a whole. In the early years of development the average daily output per well amounted to about 200 bbls; in 1910 it averaged about 100 bbls.; in 1925, about 45 bbls; but since the Revolution the average output has been increased substantially, being 55 bbls. in 1927 and the estimated 80 bbls. for 1937. Against the larger wells, however, are many whose output is exceedingly small, such as at Shubany (Atashka) where the old wells produce but a few barrels per well per day and make from 90 to 95 per cent water. Some wells, after coming in at a high initial production, fall off rapidly in output and suffer premature water encroachment as at Kara-Chkhur (Kaganovitch). On the average, however, the wells of the Apsheron area rank among the best in the world, being of substantial settled output, moderately long life, and large ultimate production. Up to January 1, 1937, the Balakhany-Sabunchy-Ramany field had produced a total of approximately 1,540,000,000 bbls. of crude oil, while the Bibi Eibat field had produced a total of 525,000,000 bbls.

Kabristan—This is an extensive and almost desert country lying west and south of the Apsheron Peninsula. It is devoid of arboreous vegetation and almost uninhabited. The relief is expressed in a system of low ridges and isolated elevations dissected by broad depressions often occupied by salt marshes. Many of the isolated elevations are mud volcanoes rising as high as 1,200 feet above the low level of the plain.

To date no productive oil fields are in operation in the Kabristan area, but considerable deep drilling is taking place and the area is known to contain substantial deposits of commercial importance. On the basis of the results of drilling thus far, proved reserves of the area are estimated at 151,200,000 bbls., while on the basis of geology, potential reserves are estimated at 5,008,500,000 bbls.

The stratigraphy of the Kabristan area resembles closely that of the Apsheron Peninsula. In

TABLE 4—RESERVES OF CRUDE PETROLEUM IN THE AZERBAIDJAN DISTRICT OF THE CAUCASUS REGION, U.S.S.R., JANUARY 1, 1937

Area—	Proved		Possible		Total	
	Thous. bbls.	Per cent	Thous. bbls.	Per cent	Thous. bbls.	Per cent
Apsheron Peninsula	3,714,900	91 1	1,754,200	12 6	5,469,100	30 6
Kabristan	*151,200	4 8	5,008,500	36 4	5,159,700	28 9
Kura Plain	(*)	....	4,046,700	29 0	4,046,700	22 6
Caspian	128,800	4 1	3,061,800	22 0	3,190,600	17 9
Total Azerbaidjan	3,994,900	100 0	13,871,200	100 0	17,866,100	100 0

*Kura Plain included in Kabristan.

general, however, the oil is found in somewhat lower horizons, mainly in the Miocene and Paleogene in anticlinal structures sealed by unconformities. The horizon being developed is chiefly the Upper Maikop (Lower Miocene) where sands and sandstones appear.

Geologic structures are closely related to the physiography, following generally the line of mud volcanic ridges. A complicated system of bending and branching anticlinal folds extends from the west in a direction closely paralleling the general strike of the Caucasus. Among these structures are Shiky Kaya, Utalgy, Touragai, Kianiza Dag. Duvanny, and Anart. These structures were formerly considered unfavorable because of the mantle of mud volcanic breccias to which their origin was described. Productive beds, however, are expected at depths not exceeding 4,000 or 4,500 feet.

Kabristan abounds in surface indications of oil and gas, but most of the early drilling was carried out on denuded structures where the oil had been dissipated. At present, only structures which are known to contain the upper productive formation are being explored.

Kura Plain

Kura Plain—This area lies south and west of the Kabristan district in the broad valley of the Kura River between the uplift of the Main Caucasus on the north and the Small Caucasus on the south. It is an extremely monotonous and even plain which as far as 120 miles back from the Caspian coast is elevated but 50 feet above the sea level. The monotony of the plain is broken by a series of low but long ridges extending south-southeastward in three or four parallel lines. Some extraordinarily large mud volcanoes are confined to the eastern part of these ridges.

At present, there are three producing fields in the area: Nefte Chala, discovered in 1926, located south of the Kura River about 10 miles; Pirsagat, discovered in 1936, located north of the Kura River about 35 miles; and Naphtalan on the slopes of the Small Caucasus to the southwest. The output of Nefte Chala averages something less than 500 bbls. of crude oil daily; the production of Pirsagat is said to be much larger; but that of Naphtalan is small and inconsequential. Possible reserves of the entire area are estimated at about 4,047,000,000 bbls.

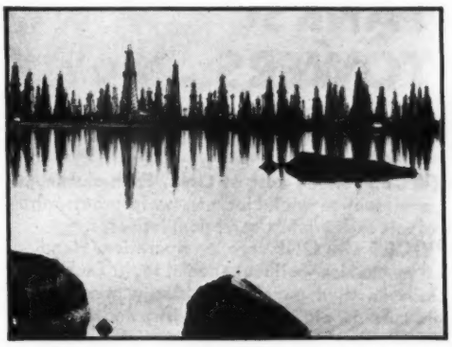
Geologically, the plain represents a depression, filled largely with thick elastic Neogene deposits mostly of fresh water or continental origin. The low-lying ridges striking south-southeastward through the plain are subordinations to the Main Caucasus system. They are separated by broad, flat synclines which are filled with Upper Quaternary beds and loess-like loam. In addition to the folds exposed at the surface, many heavily denuded structures lie buried below the later clastics. These buried structures are being discovered by means of geophysical prospecting, mainly by electrometric and magnetometric methods. The geophysical work is checked by drilling to key beds with portable rigs. It is in this manner that the Pirsagat and Nefte Chala oil fields were discovered.

The Pirsagat field is the most important locality in the area at the present time. Here recent deposits are underlain by the Baku stage about 300 feet thick. The Baku is followed by the thick calcareous clays, with intercalations of volcanic ashes followed by limestones and gray clays. The thickness of the Apsheron increases from arch to limbs on the fold, and its total thickness is about 2,550 feet. Below the Apsheron lies the Akchaghylian dark gray shaly clays interspersed by ashes and having a total thickness of about 350 feet. Immediately below lies the productive formation.

The structure of the Pirsagat field is not fully established. Apparently it is a domal portion of the Kotur Dag uplift, but the structure is complicated by a fault of great displacement which dips northeast at about 75 degrees. Seaward from Pirsagat, several mud volcanoes rise from the mantle of mud breccia. Besides gas, one of the volcanoes produces oil.

The first deep wells were located at Pirsagat in 1932, but these experienced difficult drilling conditions quite unlike those in the Apsheron Peninsula. Caving is the greatest difficulty. In 1936 the first successful well flowed oil at the rate of 2,450 bbls. per day from a depth of 3,765 feet. Production is from the upper part of the productive formation. The lower productive has not yet been opened.

At Nephte Chala the output is obtained from the Lower Apsheron gray clays with interbeds of volcanic ashes, lying well above the productive formation. The productive formation has been



Bay of Ilyich field, Baku

penetrated, however, and one well produced oil at the rate of 1,400 bbls. per day. In the west there are numerous oil and gas indications, and the small Naphtalan field, situated on the slopes of the Small Caucasus, indicates the entire Kura Plain to have potentialities and to extend westward into the fields of Georgia.

Caspian—Along the Caspian Coast northwest of Apsheron, some production has been obtained for many years at the contact between the Tertiary and the Cretaceous, and in the Cretaceous as well as in the Lower Tertiary. Along this coast is a prominent zone of overthrust where the Cretaceous overlies the Tertiary. Although many shallow and deep wells have produced oil from the Cretaceous, commercial oil is expected mainly in the Maikop (Lower Tertiary) beds which are considered to be the most potential throughout the Caucasus. Siazan and Shuraabad are the principal places where a small production has been obtained. The Cretaceous oil averages about 37 degrees A.P.I. gravity and yields 23 per cent gasoline. Notwithstanding that the geology is complex and accumulations of oil are small and spotty, the area is believed to hold a potential reserve in excess of 3,000,000,000 bbls.

Northeast Caucasus District

The Northeast Caucasus district lies northwest of Azerbaidjan on the northeastern flank of the Main Caucasus Range in Chechenian-Ingushetia and southern Daghestan. It is an open, partially wooded foothill country moderately populated with about 2,000,000 inhabitants. It may be divided into two oil-producing areas: Grozny, in Chechenian-Ingushetian A.S.S.R. inland from the Caspian Sea; and Daghestan, along the south Caspian Coast of the Daghestan Republic.

TABLE 5—PRODUCTION AND RESERVES OF CRUDE PETROLEUM IN THE NORTHEAST CAUCASUS DISTRICT, CAUCASUS REGION, U.S.S.R., BY AREAS, JANUARY 1, 1937

Area—	Past Production		Reserves				Ultimate Production	
			Proved		Possible			
	Thous. bbls.	Per cent	Thous. bbls.	Per cent	Thous. bbls.	Per cent	Thous. bbls.	Per cent
Grozny	595,602	99.9	472,500	50.0	751,100	56.1	1,819,202	61.8
Daghestan	683	.1	472,500	50.0	549,500	43.9	1,022,683	38.2
Total Northeast.	596,285	100.0	945,000	100.0	1,300,600	100.0	2,941,885	100.0
Per Cent	20.2		35.6		44.2		100.0	

Geologically, the district is, very broadly, one of Tertiary sands and clays overlying Cretaceous limestones and marls folded along lines consistent with the structure of the Main Caucasus. The folds are in whole or in part overlain or flanked by Quaternary and Recent alluvium. The oil is found mostly in sandstones of Middle Miocene age with extreme stability of facies. A characteristic of the oil-bearing structures of this district is the overthrust anticline.

In both production and reserves, the Northeast Caucasus district ranks second—albeit a poor second—to the Azerbaidjan district. During 1936, the output of crude oil in the Northeast Caucasus averaged 65,744 bbls., daily, or 15.4 per cent of the daily average for the Caucasus region. Up to January 1, 1937 a total of 596,284,500 bbls., of crude oil, or 16.6 per cent of the total produced in the region, had come from the Northeast Caucasus district. As of the same date, proved reserves of the district amounted to 945,000,000 bbls., or 23.6 per cent of the total for the region, and possible reserves amounted to 1,300,600,000 bbls., or 7.6 per cent. For the entire district, proved reserves amount to 42.1 per cent of the total reserves; and 21.0 per cent of the ultimate production had been recovered. At the beginning of the year, there were five producing oil fields in the district, and 18 new localities were being prospected by deep drilling.

Grozny Area

The Grozny area is the most important in the Northeast Caucasus. It accounts for nearly all of the current output of crude oil, and has produced all but a small fraction of the total production in the district up to January 1, 1937. It holds 50 per cent of the proved reserves, 56 per cent of the possible reserves, and 62 per cent of the ultimate production. The Daghestan area, however, despite its small output to date, is considered to hold proved reserves equal to those of Grozny and to have almost as much possible reserves.

Grozny. This area lies south of the Terek River in the vicinity of the towns of Grozny and Ordjonikidze. It occupies the foothill country in Chechenian-Ingushetian A. S. S. R. The mountainous country to the south is called the Cherny-Gory (Black Hills). These hills consist of Tertiary strata lying in monoclinal structure over steep box-like folds in Cretaceous rocks. The Tertiary beds dip away northward from the Black Hills to form the Sunja synclinorium whence they rise into the Sunja anticlinorium. From this uplift, they dip again to form the Alkhan-Churt syncline whence they rise for a second time into the Terskey anticlinorium. From this uplift, the Tertiary beds dip away to the north into the deep synclinal depression which separates the Caucasus zone of folding from the Donbass Manghyshlak folding. The two great more or less parallel anticlinal uplifts, Sunja and Tersky, extend east-west across the country for 90 miles or more. It is on these great uplifts that the present producing oil fields of the Grozny area are located.

On the Sunja anticlinorium are the Old Grozny (Staro-Grozny) and New Grozny (Novo-Grozny) fields. Up to January 1, 1936, these two fields had produced 570,000,000 bbls., of crude oil, or 98 per cent of the total for the area. On the Tersky anticlinorium are the three small fields of Malgobek, Voznessenka, and Braguny and a number of isolated producing wells which together up to January 1, 1936, had produced a total of about 15,000,000

bbls., or less than 3 per cent of the total for the area.

Oil seepages near Grozny have been known from olden times. Oil was first obtained by pails from hand dug pits, and between 1833 and 1875 more than 42,000,000 bbls., was obtained in this primitive manner. The first drilled well was completed in the Old Grozny field in 1893. By 1900, there were eleven companies operating more than 100 wells. In 1913 a second oil field, New Grozny, was discovered east of the old field.

The Old Grozny field is on faulted assymetrical anticlines most of which have steep north limbs. The field is nearly 15 miles long but less than a mile wide. The New Grozny structures are more symetrical but also faulted. The oil comes from productive horizons in the Karagan sandstones and Chokrak deposits of Lower Miocene age. These formations are represented by thick sandstones separated by clayey strata. Altogether 22 productive horizons are known. These beds consist of uniformly coarse-grained and highly porous sandstones aggregating more than 500 feet in thickness in a petroliferous zone nearly 2,000 feet thick.

The productive structures are box-like anticlines (that is, anticlines with a gentle arch and steep limbs with a squeezed core) which are characteristically overthrust and faulted. The Pilocene beds are not involved directly in these folds but dip away gently from the tightly compressed Miocene and Paleogene rocks. On the crests of the higher folds, notably in the New Grozny field, Upper Miocene clays are exposed.

The oil of the Old Grozny fields ranges in gravity from 21° to 37° A. P. I. and is high in paraffin content. In general the oil from the Sunja anticlines is of higher gravity and richer in paraffin than that from the Tersky fields which, although of lower gravity, is richer in lubricating stock.

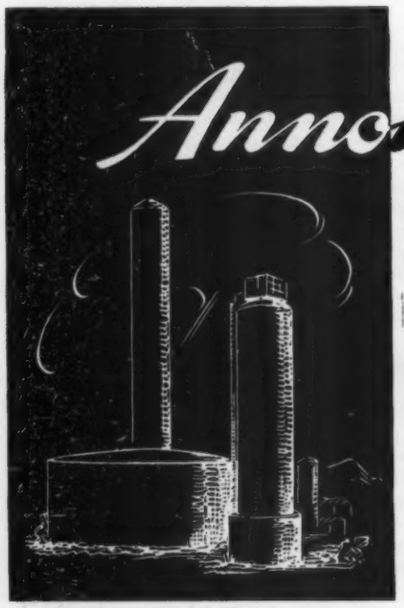
Although many of the wells have been remarkably large and long of life, most of them decline rather rapidly and have only a moderate length of life. Well No. 54 on the eastern plunge of the Old Grozny field flowed for longer than eight years and produced in excess of 10,000,000 bbls., but the average flowing life is less than two years and the ultimate productive life between 15 and 20 years.

On the Tersky anticlinorium the small Braguny field was the only one producing prior to 1914. Drilling began in the Voznessenka field in 1901, and at Malgobek in 1927. Between 1914 and 1920 some work was done at Gudermess, and recently (1936) deep drilling has established some production at Gorskaya Mountain.

At Malgobek, commercial production did not result until 1933 notwithstanding earlier exploratory work. On January 1, 1936 there were 263 wells in the field, 160 of which were producing. Up to that date, a total of about 6,500,000 bbls., of crude oil had been produced. Structurally, the field is a western prolongation of the Voznessenka field. At the surface are Lower Pliocene and Upper Miocene beds in a complex fold overturned in a northern direction. The overthrust portion is further complicated by several dislocations. Productive horizons embrace the lower part of the Karagan (upper Middle Miocene) and the top of the Chockrak beds (lower Middle Miocene) which are alternating clays, sandstones and marls. The Voznessenka field is an eastern extension of the Malgobek field. Between the years 1901 and 1917, twenty-two wells had been drilled here, and five of them established that commercial production was associated with the sandstones of the underthrust of the northern part of the Voznessenka fold. Up to January 1, 1936, approximately 4,500,000 bbls., of crude oil had been taken from the Voznessenka pool. Structurally, the accumulations are associated with an anticlinal fold striking in an east-west direction but divided by a north-south bend into the southern and northern folds. The surface beds are lower Upper Miocene and upper Middle Miocene. The fold is overthrust in a northern direction. The Karagan and Chockrak sandstones of the underthrust part of the fold are the productive horizons. There are nine oil horizons at depths ranging from 900 to 2,100 feet.

Daghestan.—The petroliferous area of Daghestan is bounded by the Rubas Chai River on the south and the Sulak River on the north, a distance of about 120 miles. On the east it is terminated by the Caspian Sea and on the west by the mountainous range lying from 18 to 30 miles back from the shore.

Oil was obtained from hand-dug pits in the 1870's and drilling began in the 1890's at Kaja Kent and Berekei where a small production was secured. In 1935 operations were recommenced here, and although a production of less than 15 bbls., a day has been developed, the depth is shallow and the



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productive area large. In 1936 exploitation of the Achi Su field began and about 300 bbls., per day is expected. Also in 1936 an important discovery was made at Izber Bash where a well flowed at the rate of 1,400 bbls., of oil per day from a depth of 4,950 feet. Up to January 1, 1936 a total of approximately 681,000 bbls., of crude oil had been obtained from the area; and of this total 579,000 bbls., or 85 per cent came from the shallow Berekei field; and 102,000 bbls., or 15 per cent from Kaya Kent.

The exposed rocks in the foothills of the area are of Tertiary age. The northern part is marked by Quaternary terrace deposits from the Caspian Sea. The Tertiary beds range in age from Upper Pliocene to Eocene and are up to 12,000 feet thick. The structure is dominated by the typical northwest southeast regional folding of the Main Caucasus. In the mountainous section, the Mesozoic strata are characteristically arranged in box-like folds. Tertiary beds flank the Mesozoic rocks and are regionally arranged in two large anticlines which are complicated by huge overthrust faults. The main oil and gas fields are confined to the eastern fold.

Commercial oil deposits occur chiefly in the sandy portions of the Miocene but numerous indications have been recorded in the Lower Miocene-Oligocene (Maikop) beds and in the Eocene (Foraminifera shale). Commercial accumulations of gas are confined to the Maikop beds. At present, oil is produced in the Berekei, Kaya Kent, Achi Su, and Izer Bash fields, and a small amount of gas in the Dag Ogny gas field. The depth of wells ranges from an average of 544 feet of Berekei to 1,110 feet at Kaya Kent. Notwithstanding the shallow depth, 80 per cent of the wells have been failures at Berekei, and 40 per cent have been dry at Kaya Kent. The gravity of the oil at Berekei averages about 37° A. P. I. and contains from 40 to 45 per cent gasoline and kerosene. It is expected that deeper drilling will yield better results, but the area as a whole is one of great development hazards.

Kuban and Azov-Black Sea District

The Kuban and Azov-Black Sea district occupies the northwestern flank of the Main Caucasus Range from the upper reaches of the Kuban River westward to the Taman Peninsula and across the Straits of Kerch into Crimea. It includes four areas; namely, Maikop, southeast of the town of that name; Kuban, to the west of Maikop and south of the Kuban River; Taman Peninsula, the western terminus of the Main Caucasus; and Crimea, west of Taman, between the Sea of Azov and the Black Sea.

The number of producing fields in this district is four. During 1936, the combined output for the district averaged 22,246 bbls., daily, or 4.3 per cent of the total for the Caucasus region. First production began in the 1860s, and up to January 1, 1937, approximately 64,000,000 bbls., of crude oil, or 1.7 per cent of the regional total, had been produced. Proved reserves are estimated at 152,600,000 bbls., or 2.8 per cent of the regional total; and possible reserves at 945,700,000 bbls., or 5.5 per cent of the total. At the beginning of the year, six new localities were being prospected by deep drilling.

The oil is found in rocks of Tertiary age. These are mainly argillaceous sands, sands, and marls flanking unconformably Cretaceous and Jurassic limestones which form the exposed core of the Caucasus in this district. In the east along the upper reaches of the Kuban River, the Tertiary beds are monoclinal in structure. Westward the folding amplifies until the younger beds become involved with the more intricate Cretaceous folding. In this direction, digitation folding is common and the brachianticline is characteristic. The regional direction of folding along the northern flank of the Caucasus is northwest-southeast. In the vicinity of Temyruk on the Taman Peninsula this line of folding comes in contact with a series of folding extending from the Kerch Peninsula northeast-southwest to form an angle of 120° with the Caucasus line of folding. The conjuncture of two diverse tectonic forces has complicated and intensified the structure and has had a marked affect on the accumulation of oil. As the older rocks of the Caucasus Ridge plunge to the west they are covered successively by the Tertiary and younger beds and on the Taman Peninsula they are for the most part concealed by Quaternary and Recent alluvium.

Epeirogenetic movements resulting in stratigraphic unconformities and transgressive sedimentation took place in the Lower Cretaceous and lasted to the post-Pliocene. Shore line changes took place throughout the Paleogene and Neogene, and it is difficult to distinguish between stratigraphic unconformities and tectonic ones, making the work of the petroleum geologist in the district, unusually difficult. Such variety of stratigraphic facies and tectonic forms explains the peculiarity of oil occurrence both in vertical section and horizontal distribution. For instance, in the Apsheron (not to be confused with the Apsheron Peninsula in Azerbaidjan) area (near Maikop), oil occurs only in the Maikop beds within the limits of the Oligocene. Westward, the stratigraphic range of oil is considerably greater, occurring in the Upper Eocene, Middle Miocene, and Pliocene.

Much of the oil has accumulated in lenticular and "sleevelike" reservoirs. Oil also occurs in small amounts in the Cretaceous, and bituminous limestones even form a part of the Jurassic.

Maikop.—This area lies along the northern spurs of the Navaghi Ridge southeast of Maikop and in the valley of the Pshysh River. Upper Cretaceous marls and limestones occur in folds which represent the beginning of the southern zone of folding developed in the direction of the Main Caucasus Range. Flanking these folded Cretaceous rocks unconformably to the north and west are Tertiary beds. They are monoclinal in structure

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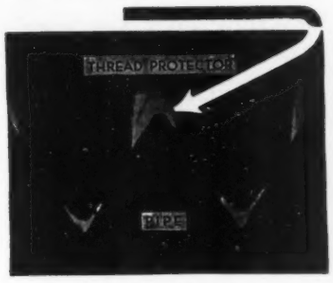

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Maikop is the most important producing area in the Kuban and Azov-Black Sea district. The Apsheron field produced an average of approximately 16,000 bbls., of crude oil daily in 1936. The smaller Khadyji field produced about 6,000 bbls., daily. The only other important field is Asphalt Mountain but the output is small. Development in the Maikop area began in 1909 but remained inconsequential until the Soviets undertook work in 1923.

The oil in this area comes from the Maikop beds (Oligocene and Lower Miocene). The productive zone is about 1,800 feet thick. The commercial horizons consist mainly of sandy clays and sands which are completely sealed and thicken down the dip. Structure is monoclinal. Reservoirs are of the "channel" or "shoe-string" variety, occupying buried stream channels and shore lines. Two factors mainly control the commercial accumulation of oil in the Maikop. They are the form of structure of the sandy reservoirs and sometimes the lithological character of the beds themselves.

The quality of the oil and the productivity of horizons varies widely. "Heavy" oil comes from the Middle, and "light" oil from the Lower Maikop. The depth of wells ranges from a minimum of 470 feet at Asphalt Mountain to a maximum of 3,300 feet at Apsheron and Khadyji. The average initial output of wells ranges from 105 bbls. daily at Khadyji to 510 bbls. at Apsheron, but from individual wells the initial output is sometimes high; in at least one instance reaching 7,000 bbls. Ultimate yield is also sometimes high, one well completed in 1930 having produced more than 2,600,000 bbls. of oil by 1935. Some wells yield much gas and others very little. Edge-water forms a part of most of the productive horizons. The producing fields are only partly developed. The chances for deeper production in the proved areas and for extended production down the regional monoclinal dip are considered good.

(To Be Continued)

Ganso Azul Ships Material To Drill Peruvian Acreage

Drilling and auxiliary equipment for the exploration of an isolated concession in Peru has been shipped to that country by the Ganso Azul Petroleum Co., which holds approximately 90,000 acres of land along the Pachitea River, a few miles above its confluence with the Ucayali River in the Department of Loreto.

The Ganso Azul Co., organized in California to acquire the Selden, Breck rights and to carry forward drilling operations, is said to have no connection with any other existing oil concern. It is to be registered in Peru as the Cia. de Petroleo Ganso Azul ("Blue Goose") with a capital of S/. 2,000,000.

Operating headquarters of the company have been established at a point known as "Agua Caliente," about 30 miles above Masisea which is the junction point for land planes and hydroplanes on the Peruvian National Air Line, operating between San Samon and Iquitos.

Preliminary work on the concession, consisting of the construction of water terminal facilities, clearing of a roadway through 12 kilometers of jungle from the river bank to the location, construction of quarters for the crew and derrick foundations has been under way for several weeks.

The drilling equipment consisting of heavy duty rotary rig, derrick, drill pipe, engines, and casing was loaded at New York and Philadelphia aboard the "Swinburn" which has arrived at Para. The approximately 800 tons of equipment will be delivered at Agua Caliente by steamer and barge and thence overland to the location selected.

California Oil Field Operations for November, 1937

According to figures collected by the American Petroleum Institute, the total production of crude oil in California for November amounted to 21,059,637 bbls., an average of 701,988 bbls. per day. This is an increase of 7,507 bbls. per day over October production.

Total stocks of crude and all products in Pacific Coast territory increased during the month 917,914 bbls. The total stocks at the end of the month were 124,289,318 bbls. The total stock decrease for 1937, up to November 30, was 7,054,418 bbls.

One hundred and one wells were completed during the month with an initial daily production of 58,888 bbls., compared with 96 wells completed during October with an initial production of 62,767 bbls.

CRUDE PETROLEUM PRODUCTION

(Figures of Production and Stocks are in barrels of 42 gallons)

	Total production November	Daily average Nov., 1937	Daily average Oct., 1937	Daily average Nov., 1936
Group No. 1:				
Belridge—North	500,204	16,673	16,648	13,533
Belridge—South	44,773	1,492	1,779	1,869
Canal*	17,100	570		
Coalinga	470,647	15,688	15,815	15,732
Edison	118,431	3,948	3,943	5,683
Elk Hills	330,038	11,001	10,963	8,270
Fruitvale	240,705	8,024	8,535	8,941
Greeley	84,549	2,818	2,215	...
Kern River	448,399	14,947	15,381	14,525
Kettleman Middle dome	2,884	96	101	268
Kettleman North dome	2,450,654	81,689	81,195	77,607
Lost Hills	126,431	4,214	4,145	3,613
McKittrick	135,181	4,506	4,512	1,764
Midway-Sunset	2,223,436	74,115	73,465	61,979
Mountain View	480,654	16,022	17,262	21,999
Mount Poso	630,305	21,010	19,749	18,022
Rio Bravo†	48,513	1,617	...	...
Round Mountain	485,723	16,191	15,166	11,551
Ten Section	102,337	3,411	3,031	1,181
Wheeler Ridge	9,385	313	312	343
Group No. 2:				
Capitan	91,175	3,039	2,919	1,796
Elwood	237,944	7,931	8,315	11,666
Rincon	112,690	3,756	3,599	2,123
San Miguelito	104,161	3,472	3,570	2,214
Santa Barbara	16,711	557	574	906
Santa Maria	413,920	13,797	13,764	5,325
Summerland	1,010	34	34	36
Ventura Avenue	1,092,973	36,432	34,706	34,309
Ventura-Newhall	155,428	5,181	5,107	4,988
Watsonville	1,800	60	60	60
Group No. 3:				
Brea-Olinda	184,426	6,148	6,151	8,050
Coyote—East	130,338	4,345	3,955	2,852
Coyote—West	286,227	9,541	7,056	7,847
Dominguez	885,856	29,529	29,297	25,317
El Segundo	573,159	19,105	21,818	377
Huntington Beach	1,080,553	36,018	36,275	35,102
Inglewood	483,108	16,104	16,137	12,476
Lawndale	2,669	89	89	105
Long Beach	1,735,988	57,866	57,788	65,416
Los Angeles-Salt Lake	17,161	572	574	817
Montebello	223,286	7,443	7,871	9,110
Playa Del Rey	232,088	7,736	7,789	10,986
Potrero	12,540	418	389	290
Richfield	282,725	9,424	9,015	7,096
Rosecrans	136,582	4,553	4,218	2,231
Santa Fe Springs	1,247,238	41,575	41,365	45,186
Seal Beach	279,933	9,331	9,419	8,759
Torrance	231,950	7,732	7,223	8,827
Whittier	27,228	908	888	930
Wilmington	1,828,421	60,947	60,299	...
Total November	21,059,637	701,988	694,481	582,077
Total October	21,528,921	694,481		
Increase	‡469,284	7,507		

*Canal oil field.—Located about 15 miles southwest of Bakersfield in Kern County and about 4 miles northwest of Ten Section oil field. †Rio Bravo oil field.—Located about 14 miles northwest of Bakersfield in Kern County and about 3½ miles northwest of Greeley field. ‡Decrease.

OILFIELD DEVELOPMENT

	New rigs up	Active drilling	Producers completed	Daily initial output	Active producing	Abd. wells: Drillers	Abd. wells: Producers
Group No. 1:							
Belridge—North	1	9	1	3,290	50	0	0
Belridge—South	0	0	0	0	127	0	0
Canal	1	1	1	2,267	1	0	0
Coalinga	0	2	0	0	873	0	0
Edison	0	0	2	180	90	1	0
Elk Hills	1	1	1	324	167	1	3
Fruitvale	0	2	3	1,000	157	0	1
Greeley	3	8	3	8,912	10	1	0
Kern River	0	4	2	220	1,342	1	1
Kettleman Mid. dome	0	1	0	0	3	0	0
Kettleman No. dome	2	12	0	0	177	0	0
Lost Hills	0	2	2	343	207	1	0
McKittrick	0	1	1	25	212	0	0
Midway-Sunset	6	10	10	1,683	2,520	0	16
Mountain View	1	7	2	1,140	193	0	0
Mount Poso	7	6	10	2,395	275	0	0
Rio Bravo	2	0	1	2,550	1	0	0
Round Mountain	9	6	7	3,377	157	1	0
Ten Section	3	4	0	0	7	0	0
Wheeler Ridge	0	0	0	0	26	0	0
Group No. 2:							
Capitan	0	0	0	0	39	0	0
Elwood	0	0	0	0	83	0	0
Rincon	2	1	0	0	35	0	1
San Miguelito	0	2	1	165	14	1	0
Santa Barbara	0	0	0	0	37	0	1
Santa Maria	11	19	12	9,396	277	0	0
Summerland	0	0	0	0	19	0	0
Ventura Avenue	1	6	3	1,833	260	0	0
Ventura-Newhall	2	14	2	171	581	0	0
Watsonville	0	0	0	0	7	0	0
Group No. 3:							
Brea Olinda	0	1	0	0	368	0	0
Coyote—East	0	0	1	597	84	1	0
Coyote—West	0	1	0	0	34	1	0
Dominguez	2	5	0	0	159	0	0
El Segundo	2	18	6	3,707	41	0	1
Huntington Beach	1	0	0	0	577	0	2
Inglewood	0	1	0	0	198	0	6
Lawndale	0	0	0	0	7	0	0
Long Beach	7	7	3	303	1,244	0	4
Los Angeles-Salt Lake	0	0	0	0	113	0	0
Montebello	0	1	0	0	201	0	0
Playa Del Rey	0	0	0	0	201	0	2
Potrero	0	1	0	0	10	0	0
Richfield	4	7	2	320	283	0	0
Rosecrans	1	3	0	0	82	1	0
Santa Fe Springs	0	2	0	0	660	0	5
Seal Beach	0	1	0	0	111	0	0
Torrance	0	0	2	173	535	0	1
Whittier	0	1	0	0	155	0	0
Wilmington	22	28	22	14,517	323	0	0
Miscellaneous drilling	13	51	0	0	0	9	0
Group No. 4—Gas fields:							
Buena Vista Lake	0	0	0	0	5	0	0
Butonwillow	0	0	0	0	0	0	0
Chowchilla	0	0	0	0	0	0	0
Delano	0	0	0	0	1	0	0
Dudley Ridge	0	0	0	0	0	1	0
Goleta	0	0	0	0	1	0	0
McDonald Island	0	1	0	0	4	0	0
Rio Vista	1	1	1	gas	6	0	0
Semi-Tropic	0	1	0	0	7	0	0
Tracy	0	0	0	0	6	0	0
Total November	105	249	101	58,888	13,362	20	44
Total October	111	260	96	62,767	13,370	31	25
Decrease	6	11	*5	3,879	8	11	*19

*Increase.

STOCKS HELD IN PACIFIC COAST TERRITORY BY CALIFORNIA OIL COMPANIES

	Nov. 30, 1937	Oct. 31, 1937	November changes	Nov. 30, 1936
Fuel oil residuum and non-gasoline-bearing crude	65,376,608	64,502,327	+874,281	64,638,434
Gas oil and diesel oil	7,438,542	7,266,217	+172,325	8,990,339
Gasoline-bearing crude	30,078,424	30,261,980	—183,556	33,680,672
Unblended natural gasoline	2,023,555	2,041,658	— 18,103	1,881,469
Gasoline (not including distributing and service sta.)	11,868,246	11,561,625	+306,621	11,142,817
Naphtha distillates	*1,536,420	*1,692,231	—155,811	*1,788,556
All other stocks	†5,967,523	†6,045,366	—77,843	†8,089,027
Total	124,289,318	123,371,404	+917,914	130,211,305
*Estimated amount of unfinished gasoline contained in line 6	1,320,028	1,417,212		1,462,241
†Coke included in line 7	24,884	33,241		261,448

Researches in Petroleum at the University of Birmingham

The Department of Oil Engineering and Refining at the University of Birmingham is the only school of that nature in England. The idea of a science college in Birmingham originated with Josiah Mason, a native of Worcestershire, born in Kidderminster in 1795. Self-taught, he developed a special interest in scientific education and in 1870 executed the foundation deed for Masons College, which, through the efforts of Joseph Chamberlain, became the University of Birmingham in 1900. Sir Oliver Lodge was the first principal.

A certain amount of the money subscribed for the university had been earmarked for specific purposes and from these funds the university was enabled to erect, in 1920, separate buildings for the Department of Oil Engineering and Refining. In this year several large British and foreign oil companies liberally endowed the department to enable those desirous of becoming petroleum technologists to receive a sound education in the subject before passing into the petroleum industry.

Main Building, Department of Engineering and Refining, Birmingham University, England.

The courses of study in the department have been arranged to meet the requirements of every branch of the industry and comprise lectures and laboratory work on the various methods of practical drilling, production, refining and field work, including the geological, engineering, chemical and surveying sides. Every effort is made throughout the course to give a thorough training in those fundamental principles which underlie the sciences involved.

The course extends over four years and classification into honors and ordinary Bachelor of Science degrees is made after the final examination at the termination of the fourth year.

The laboratories and "oil field" of the department are equipped with modern apparatus and full sized rigs are installed for drilling instruction. Experimental work is carried out in the various problems encountered in oil field practice, including those on the various forms of power employed and types of drilling appliances. It is unfortunate that production methods cannot be considered in Great Britain but through the kindness of the various oil companies those students who are definitely specializing in petroleum engineering, as applied to production practice, and any other student who desires to make the trip, spend some months during their course on oil fields abroad where they obtain instruction in this branch of the petroleum industry. These students are thus able to put into practice the theory they have received during their lecture course.

Research Laboratory, Department of Engineering and Refining at Birmingham University

Those students specializing on the refining side of the industry spend a period in refineries at home or abroad before being admitted to a degree.

Since the conditions throughout the oil producing regions of the world will vary considerably from area to area it is obviously impossible to give instruction on all these conditions and only the general aspects pertaining to all areas are considered. Such knowledge should enable the student to select the correct methods of approach to the problem for the particular area in which he may be stationed.

The work of the petroleum engineer involves a thorough knowledge of the basic fundamentals in mathematics, physics, chemistry and geology, and the course is comprised of these together with their allied subjects such as mechanical, civil and electrical engineering.

Specialization takes place during the fourth and final year. Up to that year the student is instructed in all branches of the industry so that at the completion of the third year he is in a position to decide which branch is of the greatest interest to him.

During the final year students are given the opportunity of assisting members of the staff in research and are required to write a thesis on the work for which they are made responsible. This enables the student to obtain an insight into the type of work he may be called upon to perform when he joins the industry. It also gives him an opportunity to study the methods of attack to particular problems and inculcates in him

NATIONAL BANK OF TULSA

Tulsa, Oklahoma

Statement of Condition, December 31, 1937

RESOURCES

Cash and Due from Banks	$25,420,079.74	
U. S. Government Securities	13,946,926.80*	
Other Bonds and Warrants	6,070,716.18*	45,437,722.72
Loans and Discounts		17,686,580.22
Overdrafts		1,468.01
Income Receivable Accrued		130,731.78
Stock in Federal Reserve Bank		180,000.00
Investment in Bank Premises		2,655,720.62
Customers' Liability under Acceptances		10,075.10
TOTAL		$66,102,298.45

LIABILITIES

Deposits		$59,623,011.20
Acceptances Executed		10,075.10
Income Collected not Earned		60,652.78
Interest, Taxes, etc., Accrued		76,564.59
Reserve for Preferred Dividends		22,500.00
Capital—Preferred	$1,500,000.00	
Capital—Common	2,250,000.00	
Surplus	2,250,000.00	
Undivided Profits and Reserve	309,494.78	6,309,494.78
TOTAL		$66,102,298.45

* Of the total of $20,017,642.98 U. S. Government Securities and Other Bonds and Warrants $14,170,818.71 par value mature within five years.

COMPARATIVE DEPOSITS

December 31, 1933	$28,016,837.43
December 31, 1934	37,292,321.66
December 31, 1935	46,600,899.11
December 31, 1936	56,870,480.59
December 31, 1937	59,623,011.20

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the necessity for accurate and careful recording of all results obtained.

From among these students it may be possible to select one or more to continue their studies for higher degrees and the information gained by those whose duty it is to appoint research workers is obtained during the final year.

The scientific bias so noticeable in the industry at the present moment demands accurate work and much can be done during the final year to insure that all those leaving the university realize its importance. If greater knowledge of the many perplexing problems confronting the industry is to be forthcoming young graduates must be capable of investigating these problems from the scientific standpoint. The course undertaken by students in the Oil Engineering and Refining Department of the University of Birmingham has been devised with this end in view and although the department has only been in existence so few years many of its graduates have already made their mark in the industry.

Research has always played an important part in its activities and the department has been fortunate in having had a large number of extremely capable post-graduate workers.

During the first few years of the existence of the department no research of any note was possible owing to the lack of facilities but in 1923 a program of fundamental research was initiated and serious investigation of six main lines was conducted. Such varied subjects as (1) Berginisation, (2) Synthetic fuels from water gas, (3) Decomposition of methane, (4) Vapor phase oxidation, (5) Cracking, and (6) Determination of unsaturates in gasolines, were dealt with during the succeeding years.

The hydrogenation of bituminous substances under high hydrogen pressure, in the presence of catalysts, was investigated and attention was drawn to the effect of catalysts in this reaction.

Experiments on coal, lignin and cellulose carried out in the department supported this view and considerably increased the scope of the old noncatalytic Bergius process. Three years were spent on this branch of research and the results obtained have been reported in the technical literature.

The work on the formation of paraffin hydrocarbons from methane to higher waxes was carried out concurrently with that of Fischer but whereas the former worker used principally catalysts of the eighth group of the periodic classification the catalysts used in this department were those represented to stand low in the list of activities. It was found that the reaction products consisted of olefines and oxygenated compounds in addition to the paraffin hydrocarbons described by Fischer. The appearance of the olefines and oxygenated compounds were later confirmed by Fischer.

The thermal decomposition of pure dry methane was exhaustively studied in 1926 and the results of this work were recorded in the Journal of the Institution of Petroleum Technologists.

Following on this project an investigation in the production of synthetic lubricating oils by the polymerization of ethylene was commenced. This work has been continued over a period of years and is attracting wide attention at the moment on account of its national importance.

In 1930 work was commenced in the synthesis of the olefines and the knock rating of these substances. This work was carried on over a period of two years.

In 1931 a major research project concerned with the investigation of solvent refining methods with particular reference to the solvent refining and dewaxing of lubricating oils was begun. This project is now well under way and the results are reported from time to time in the technical literature.

On the production side the major research at present in hand deals with the application of physico-chemical principles to the investigation

of the properties of rocks, including porosity and permeability and the resistance to acid treatment of oil formations.

Throughout the period during which the department has been able to conduct research, attention has been focussed as far as possible on fundamental problems leaving technological research of more immediately obvious industrial application to commercial laboratories better equipped for such work.

A.I.M.E. Geophysical Division Program for New York Meeting

The preliminary program for the Geophysical division of the American Institute of Mining and Metallurgical Engineers at the one-hundred forty-eighth meeting in New York, February 14 to 17, follows:

GEOPHYSICAL METHODS OF EXPLORATION

Tuesday Morning

Geophysical Examination of the Fort Peck Dam and Reservoir Site in Montana, by J. J. Jakosky and C. H. Wilson, respectively, technical director and mining engineer, International Geophysics, Inc.

Practical Results Obtained from Geophysical Surveys, by Hans T. F. Lundberg, Hans Lundberg, Ltd.

Magnetometric Differentiation of the Kirkland Lake Syenites, by Walter Riddell, field manager, Acme Geophysics Exploration, Inc.

Magnetometric Investigation in Australia, by Mark M. Milstein, consulting geophysicist, Milstein & Co. Geophysical Surveys, Ltd.

Geophysical Studies of Soil Dynamics, by R. K. Bernhard, consulting engineer, Baldwin-Southwark Corp. (T.P. 834).

A New Method of Depth Determination in Earth Resistivity, by I. E. Rosenzweig, electrical engineer, assistant professor, Polytech Institute, Lwow, Poland.

Electrical and Seismic Exploration for Water in Spain, by Jose G. Sineriz, Institute Geology y Minero de Espana.

Tuesday Afternoon

(Joint session with Mineral Industry Education Division, Petroleum Division and Mining Geology Committee.)

Round Table on Geophysical Education:

The Trend in Geophysics, by Sherwin F. Kelly, chairman A.I.M.E. Committee on Geophysical Methods of Exploration.

The Status of Geophysics in a Department of Geology, by M. King Hubbert, instructor in geophysics, Columbia University.

The Organization of a Department of Geophysics, by C. A. Heiland, professor, geophysics, Colorado School of Mines.

Geophysics in a Department of Physics, by Lachland Gilchrist, professor of physics, Toronto University.

Thursday Morning

A Perspective of Geophysics:

The Expanding Field of Geophysics, by Sherwin F. Kelly, consulting geophysicist and geologist.

A World-Wide View of Geophysics, by Frederick W. Lee, chief, Geophysical Prospecting Section, U. S. Geological Survey.

The Year's Advance in Electrical, Geothermal and Radioactive Methods, by C. A. Heiland, professor of geophysics, Colorado School of Mines.

Magnetometric Methods of Subsurface Exploration in 1937, by Noel H. Stearn, geologist and geophysicist engineer, W. C. McBride, Inc.

The Present Status of Seismic Exploration, by Joseph L. Adler, geologist and geophysicist, Pathfinder Prospecting Co.

The Year's Progress in Gravitational Methods, by Donald C. Barton, consulting and research geologist and geophysicist.

A Review of Progress in Geophysical Instruments, by Shelly Krasnow, Geophysical Instrument Co.

Thursday Afternoon

Electrical Prospecting for Oil Structures, by J. J. Jakosky, technical director, International Geophysics, Inc.

The Use of Magnetic Data in Locating Oil Fields in Southwest Texas, by Robert H. Durward, geologist and magnetometer specialist.

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CONTINENTAL

FIELD OPERATIONS

Summarizing the Week's Developments

The K.M.A. deep sand field in Wichita County, Texas, continues to expand. Ten wells averaging 1,121 bbls. per well in initial production were completed in the past week. The best well started at 3,600 bbls. a day. Twenty more tests were in the process of completion. New wells extended the field westerly and to the northwest. A pool was opened in Jack County, 7 miles north of Jacksboro. A new Ordovician area in northern Pecos County seems assured. The first new pool in the Gulf Coast lies 3 miles northeast of the Satsuma field in northwestern Harris County, the discovery well flowing 24 bbls. an hour through a quarter-inch choke on preliminary test. In Southwest Texas a new sand, showing oil on a drill stem test, was opened in the Saxet field in Nueces County. A deep-seated structure was uncovered 3 miles southwest of Weslaco, Hidalgo County, which shows distillate but a lot of water in the discovery well.

KANSAS

A discovery well was completed in section 5-18-25w, northeast of the Aldrich pool in Ness County, Kansas. Arbuckle lime production was found in section 30-32-6, Cowley County. New producing areas were indicated in sections 4-22-12w and 26-23-11w, Stafford County, and sections 21-17-13w and 34-16-11w, Barton County.

OKLAHOMA

The Ramsey pool opener in Payne County, Oklahoma, was completed for an estimated potential of 11,000 bbls. daily. The second deep well in the Fox field, Carter County, was completed flowing a potential of 754 bbls. of 69-gravity oil through tubing choke, and the third deep well in the pool was flowing at the rate of 3,430 bbls. of oil daily, but had not been completed. A wildcat in Garfield County caused excitement when it missed Misener sand and Hunton lime and was checking high structurally.

NEW MEXICO

A new producing area 3 miles northeast of the Jackson pool, Eddy County, New Mexico, was opened in section 35-16-31. The new extension area south of the old Vacuum pool, Lea County, was extended one-half mile east in section 31-17-35, and a second producer offsetting the discovery in the new area was completed in section 1-18-34. The northwest end of the Cooper pool was extended one-half mile west in section 4-24-36.

WYOMING

Lance Creek, Wyoming, has another large Minnelusa sand producer which started at the rate of 1,248 bbls. a day on an 18-hour test.

CALIFORNIA

The southeastern limits of Terminal Zone production in the Wilmington field's harbor section appears to have been defined, giving a discouraging appearance to that part of the town lot area. A new gas field was opened in Glenn County in the Upper Sacramento Valley. The discovery well, blowing 100,000,000 feet per day, caused a crater, engulfing the rig and equipment.

MICHIGAN

Recent price cuts have slowed down the Michigan field. Four wells were completed in Buckeye, which field is now producing half the oil in the state.

Completions in All Fields

(Week Ending January 15, 1933)

	Oil	Gas	Dry	Total	1938 total comp. to date	1937 total comp. to date
N. Y., Pa. and W. Va.	68	20	10	98	282	164
Ohio	6	7	4	17	55	62
Indiana	0	0	0	0	6	10
Kentucky	5	1	4	10	30	16
Illinois	7	0	2	9	34	0
Michigan	6	0	2	8	34	49
Kansas	34	1	4	39	113	94
Oklahoma	23	4	15	42	95	119
Texas:						
North Central Texas	12	0	3	15	72	151
West Texas	47	0	8	55	136	107
Texas Panhandle	15	0	9	24	54	32
East Texas	34	0	3	37	139	132
East Central Texas	7	0	3	10	28	38
East Texas Border	1	1	0	2	11	29
Gulf Coast Texas	23	0	3	26	73	68
Southwest Texas	31	0	5	36	96	173
Total Texas	170	1	34	205	609	730
North Louisiana	11	1	2	14	40	20
Gulf Coast Louisiana	2	0	4	6	28	30
Total Louisiana	13	1	6	20	68	50
Arkansas	4	0	0	4	16	0
Montana	0	0	0	0	4	9
Wyoming	3	0	1	4	15	9
Colorado	0	0	0	0	0	2
New Mexico	11	0	0	11	36	41
Utah	0	0	0	0	0	0
California	15	0	3	18	67	70
Total United States	365	35	85	485	1,464	1,425
Total previous week	379	55	88	522		
Difference	14	20	3	37		

Outstanding Fields—Highlights

(Week Ending January 15, 1933)

FIELD—	Rigs up	Wells drlg.	Weekly oil completions	Initial prod.	Total No. oil wells	Daily av. prod.
TEXAS						
Hastings	4	10	4	2,489	453	19,212
McCampbell	5	0	4	735	100	4,718
Saxet	4	8	3	56	600	40,938
Benavides	3	7	1	202	124	6,434
East Texas	45	93	37	1,753	24,364	492,253
Talco	5	8	6	1,657	605	27,800
K.M.A. (deep sands)	62	54	10	11,211	103	6,200
Ector County	20	41	19	15,958	128	27,350
Winkler County	5	48	9	3,807	1,549	41,500
OKLAHOMA						
Fitts-Jesse	7	18	2	1,408	951	77,825
Billings deep sand	1	4	1	832	60	7,400
KANSAS						
Barton County	4	43	8	8,560	280	12,075
Ellis County	5	24	8	9,750	269	9,450
Rice County	5	25	3	2,876	1,092	35,345
Russell County	8	47	10	7,835	982	33,285
NEW MEXICO						
Lea County	14	107	6	1,549	1,600	98,710
LA-ARK-TEX						
Rodessa, Ark.	3	5	2	985	59	8,810
Rodessa, La.	2	7	3	780	438	44,140
Rodessa, Tex.	0	11	1	600	387	19,535
Lisbon, La.	6	9	2	2,640	164	11,500
Shuler, Ark.	5	11	2	2,805	28	8,190
MICHIGAN						
Buckeye	8	42	4	1,775	338	25,942
ILLINOIS						
Central Illinois	16	91	7	2,606	261	24,900
CALIFORNIA						
Wilmington	11	32	3	688	351	62,750

Eastern Field Report

By STAFF CORRESPONDENT

Three Deep Tests Starting in Lower Eastern District

PITTSBURGH, Pa., Jan. 17.—Three new deep tests are starting in the lower Eastern fields all of which are important. In Southwest Pennsylvania, the Greensboro Gas Co. has made a location on the J. R. Thompson lease on Chestnut Ridge in North Union Township, Fayette County, which is about 2,600 feet north and east of the No. 1 Summit Hotel (Leo Heyn) gas well, which is still good for over 1,000,000 feet a day from the Onondaga.

In the same township, Wasson & Co. have built the rig for a test on the J. H. Sorg farm which is located about 900 feet north of the intersection of the National Highway (Route 40) and the Jumonville Road. The test on the Louisa Varndell farm has evidently been abandoned for the present as the contractor moved the rig over that hole to the location on the Sorg farm.

In West Virginia, Potter Development Co. will start spudding this week a deep test on the W. H. Orem farm in Harris district, Wood County. It is along the Wood-Jackson County line about 1½ miles from the river and located on a structural high in the Parkersburg syncline.

SOUTHEAST OHIO

In Licking County, Kundtz-Hulse, Inc., in section 12, Fallsbury Township, completed a test on the Madison Billman heirs farm in Clinton sand at 3,055 feet. It produced 20 bbls. the first day, which after the shot increased to 170 bbls. the first day.

In this county, section 5, Fallsbury Township, the M. F. Whitehill test on the William Beatty heirs farm drilled through Clinton sand to 3,046 feet and it was dry. In Perry Township, Rutledge and Mossholder completed a test on the Harbert Nethers farm, section 5, in Berea sand at 812 feet. It is a gas well gauging 100,000 feet a day.

In Muskingum County, C. T. Eagan drilled a test on the Ray Baughman farm in section 16, Jackson Township, in the Berea sand at 864 feet. It was a dry hole.

In Perry County, Preston Oil Co. completed a test on the A. C. Randolph farm, section 17, Clayton Township, in Clinton sand at 3,230 feet. It produced 10 bbls. the first 48 hours and has a volume of 100,000 feet of gas. It has not been shot. In section 17, Monroe Township, Thistle Oil Co. completed a test on the M. E. Joyce farm in the Berea sand at 1,062 feet as a gas well gauging 300,000 feet a day. In section 33, same township, this company drilled No. 29 R. Drake farm through the Berea sand to 1,060 feet. It was a dry hole.

In Washington County, a fair producer was completed. E. T. Hune and others completed No. 2 M. G. Eddy in section 34, Independence Township, in the Third Salt sand streak at 1,115 feet. It produced 25 bbls. the first day after shot and will make a 5-bbl. pumper.

SOUTHWEST PENNSYLVANIA

Several wells were completed in Southwest Pennsylvania during the week. In Plum Township, Allegheny County, Beedle and DeBone deepened No. 2 Myrtle F. McMahon from the Hundred Foot sand to the Speechley where it is a gas well gauging 360,000 feet a day. In this district these operators plugged back the test on the Farrbaugh farm from the Speechley where the gas was exhausted to the Hundred Foot sand and it is an 8-bbl. well.

In Franklin Township, Allegheny County, the test of Charles B. Watcher on the William Hoffman farm is a small gas well. The test of E. Swain and others on the Peter Bole farm is dry. The test of J. E. McNanny and others on the W. A. Glause farm is also dry. In Ross Township, Updegraff and others completed the test on the Warbloc farm as a gas well.

In Morris Township, Washington County, Duquesne Gas Co. completed the test on the D. B. Hughes farm at 2,862 feet. The Thirty Foot sand was at 2,826-60 feet; gas 2,736-50 feet and a gauge of 100,000 feet a day. After the shot the gauge increased to 450,000 feet a day.

In Amwell Township, Washington County, Carnegie Natural Gas Co. was deepening No. 4 N. B. Redd and with the top of the Gantz sand at 2,615 feet and an estimated 500,000 feet of gas was struck which was deepened to 2,670 feet. At that depth the oil spray ignited and burned for eight hours. The well is shut down for repairs.

In Peters Township, Washington County, R. M. Dudin and others are drilling at 2,472 feet No. 3 J. E. Johnston. Carnegie Natural Gas Co. spudded in the test on the H. H. Schussler farm. In Mount Pleasant Township, the McGuigan Oil & Gas Co. is down 2,448 feet on the W. W. McCarroll farm.

In South Franklin Township, Washington County, South Penn Oil Co. has reached 2,090 feet in No. 3 Piedmont Coal Co. Carnegie Natural Gas Co. is fishing in No. 3 Alberta Iams at 3,170 feet.

In East Finley Township, Washington County, Parkinson, Plants and others are running 5⅛-inch casing to 2,751 feet in the test on the L. A. Phillips farm. In Somerset Township, Victor Behm and others are running casing to 419 feet in the No. 1 J. D. Amos.

Greene County

In Center Township, Greene County, J. B. Orndoff is moving in material on the G. M. Scott farm. The Carnegie Natural Gas Co. is rigging up No. 3 J. H. Orndoff. The South Penn Oil Co. is rigging up No. 12 Samuel Harvey.

In Wayne Township, Manufacturers Light & Heat Co. is fishing for tools at 2,850 feet in No. 3557 Haddie J. Ross. Johnson and Eddy are cementing at 1,978 feet on the E. W. Maple farm. In Gray Township, Natural Gas Co. of West Virginia is down 1,884 feet in No. 2 D. G. Rush.

In Washington Township, Equitable Gas Co. has a location for a second test on the Sadie A. Connor farm. Charles L. Mong and others are drilling at 3,125 feet in No. 2 Jacon Johns, with the Fifth sand at 2,977-85 feet.

In Springhill Township, South West Pennsylvania Gas Corp. is drilling at 2,150 feet in No. 3 Thomas Smith. Union Gasoline & Oil Corp. is cleaning out to deepen No. 1 T. M. Gallentine. In Greene Township, Anna L. Garard is deepening the N. Minor and reached 2,480 feet. In Richhill Township, O. I. Dille has the rig up for the Jacon Liningood test.

Allegheny County

In Indiana Township, Allegheny County, Rodgers Development Co. is drilling No. 6 J. H. Johnston at 650 feet. In Harmar Township, this operator has a rig standing for No. 3 Grace W. Wolf. In Ross Township, Heck and others have a rig standing for a test on the Wettensoldoe farm. Here, Mendell and others are drilling on their own property and are down 560 feet. Koenig and others have started a second test on the M. Koenig farm.

In Robinson Township, Getty and Purdy are drilling at 1,200 feet on the R. Bennett farm. In Penn Township, South Penn Oil Co. is down 1,500 feet in No. 3 James Ryan. The Hope Natural Gas Co. is deepening No. 4 G. G. Mallisie in Plum Township from the Hundred Foot sand and have reached 1,900 feet.

Deep Tests

The test of Norwood P. Johnston and others on the James McBurney farm in Mount Pleasant Township, Washington County, is drilling at 6,785 feet. At 6,769 feet, the Oriskany sand began to change to a conglomerate sand, lime, calcite, and other formations indicating the top of the member. Drilling is being continued.

On Chestnut Ridge in South Union Township, Fayette County, Potter Development Co., William E. Snee and others are drilling at 5,700 feet in No. 2 Summit Hotel.

In Allegheny County, a survey of the hole of the South Penn Oil Co. and others on the Christian Z. Schove farm in Hampton Township, has been made preliminary to resuming operations.

WEST VIRGINIA

Three small producers were completed in West Virginia during the week. In Gilmer County, Glenn Tompkins completed No. 6 J. C. Collins in Glenville district at 2,795 feet, the Fifth sand, as a 1-bbl. pumper.

In Monongalia County, the Consolidated Oil & Gas Co. deepened No. 1 Leonard Shanks to 1,840 feet, Big Injun sand, and it is good for 1 bbl. a day. The Pittsburgh Coal was at 457-63 feet. The location is in Clay district.

In Wirt County, Septer W. Douglass completed the J. A. Kidwell test in Burning Springs district in the Shales at 2,550 feet. It is good for 6 bbls. a day.

Gas Wells

Gilmer County had several gas wells. In DeKalb district, Paul K. Weekley completed the Floyd W. Beall test at 1,705 feet as a gas well, with 360,000 feet of gas at 1,681-95 feet. In Glenville district, C. F. Wilson completed a test on the L. D. Edwards farm at 1,545 feet with 60,000 feet of gas at 1,505-16 feet.

In Glenville district, Pittsburgh & West Virginia Gas Co. completed the test on the Bonnett heirs farm at 1,706 feet with Big Injun sand at 1,600-90 feet and 125,000 feet of gas at 1,612-15 feet. Louie Wohine drilled a test on the Lillie Hoskins and Fitzpatrick lot to 1,642 feet with the Big Injun at 1,580-1,626 feet and dry in all formations.

In Jackson County, the Sable Oil Co. drilled a test on the L. M. Castro farm in Washington district, to 1,520 feet with the Salt sand at 1,454 feet and water intruding. It was abandoned.

In Kanawha County, the Pure Oil Co. completed No. 7 Slaughters Creek Coal & Land Co. in Cabin Creek district at 2,980 feet and it is a gas well from the Berea gauging 884,520 feet a day.

In Marion County, the Victor Oil Co. completed the Z. J. Kuhn test in Lincoln district at 3,086 feet and it is a gas well from the Big Injun sand at 1,911 feet and Fifty Foot sand 2,547 feet. The volume is small. In Monongalia County, Pittsburgh & West Virginia Gas Co. deepened the D. C. Core test, Clay district, to 3,162 feet, the Fifth sand, and it gauged 50,000 feet a day.

In Pleasants County, Ward Deems & Co. drilled a test on the Cassidy farm in Washington district through the Big Injun sand to 1,235 feet and it was a dry hole.

In Ritchie County, the B. & B. Oil Co. completed a test on the Washburn Brothers lease in Union district at 1,868 feet, the Squaw sand. It is a gas well gauging 200,000 feet a day along with about 2 bbls. of oil.

In Roane County, Bland, Ferrell, and Childress drilled a test on the Levi Moore heirs farm in Walton district, through the Salt sand to 1,750 feet and it was dry and abandoned.

In Tyler County, J. H. Beren completed a test on the W. A. Shamahorn farm in Lincoln district in the Keener sand at a depth of 1,772 feet. It is a small gas well gauging 45,000 feet a day.

(Continued on Page 132)

North Louisiana, Arkansas

By GEORGE WEBER

Shuler May Develop Into a District of Major Importance

SHREVEPORT, La., Jan. 17.—During the past week, which showed field developments of minor importance, outstanding events of interest were the hearing of the Texas Railroad Commission at Jefferson, Tex., the coring of a high well in the Shuler field of Arkansas, and progress on a number of important key wildcats drilling in the tristate area.

The possibility of an increase in allowable production in Louisiana was seen, as a result of a statement issued by William B. Rankin, commissioner of the state Department of Conservation. Mr. Rankin cited the number of discoveries in the state during the past year, adding that the allowable had been slightly decreased for the past three months, and that a rise might be justified in the near future. The possibility of an increase may bring a larger allowable to the Lisbon field, largest discovered in the state since Rodessa, and which was cut several months ago due to a pipe line situation which shows indications of having been corrected.

Jefferson Hearing

Following the request of operators and land owners in the Jefferson area of Marion County, Texas, the Texas Railroad Commission met Friday in Jefferson to hear testimony designed to give that area a name and set of regulations separate from the Rodessa field, with which it has heretofore been classified in commission regulations.

The newly discovered area, embracing a number of wells in the vicinity of Jefferson, and a second production area termed the Lodi section to the north and east, has not definitely been joined to the main part of the Rodessa field in Cass County, and indications are that it represents a separate field in the same trend. No rules have yet been issued as a result of the hearing, but testimony given by the operators was unanimous in agreement that the Jefferson area is a separate field, and should be given classification as such.

Suggestions made for different rulings included casing programs and allowable, 150 bbls. per day having been asked for wells in the field. Possibility of the increased allowable is not predicted.

Sligo Completion

In Bossier Parish, North Louisiana, the Triangle Drilling Co. completed No. 1-A Heirold and others, NE NW section 13-17-12. The test cored saturated sand at 3,012-29 feet and 5½-inch casing was set at 3,094 feet. The well came in making an initial production of 228 bbls. of oil and 1,000 bbls. of salt water, with tubing pressure of 60 pounds and casing pressure of 390 pounds. Porous lime was cored at 3,100-08 feet and total depth is 3,114 feet.

Rodessa—Caddo Parish

The Louisiana side of the Rodessa field gained three oil wells.

Standard Oil Co. of Louisiana No. 1 Terry and others, SE cor. SE SW section 2-23-16, flowed 315 bbls. per day through a 22/64-inch choke with tubing pressure of 425 pounds and casing pressure of 650 pounds. Total depth is 5,992 feet.

Trippett and others No. 1 Parker, NE cor. SE section 2-23-16, made 24 bbls. of distillate and 1,000,000 feet of gas daily on a 15/64-inch choke with tubing pressure of 100 pounds and casing pressure of 1,400 pounds. Total depth is 6,022 feet.

Vaughn No. 1 Reeves, NE cor. section 2-23-16, made an initial of 441 bbls. through a quarter-inch choke, tubing pressure 850 pounds, casing pressure 1,075 pounds, and total depth 5,983 feet.

Caddo Parish

The small Caddo and Pine Island fields of Caddo Parish added three wells during the week, and one wildcat in the parish border was abandoned as dry. W. P. Clark No. 1 Dyer, in the center of section 10-20-16 was junked at total depth of 2,279 feet.

In Caddo, the Clement No. 1-B Caddo Levy Board, NE section 5-20-16, was brought in on pump for 15 bbls. per day at 2,312 feet. J. J. Shulman No. 1 Hobbs, NW section 28-21-15, made 10 bbls. per day on the pump at 1,630 feet.

Pine Island gained a producer in Magnolia Petroleum Co. No. 22 Dillon Heirs, NE NE section 23-21-15, which pumped 22 bbls. per day at 1,730 feet, total depth.

Rodessa—Texas

On the Texas side of the field, one producer was brought in in the Jefferson section. Heyser, Heard & Clardy No. 2 Henderson, in the Bennington Survey, made 25 bbls. per hour on a quarter-inch choke at a total depth of 6,048 feet. No pressure gauges were available.

Rodessa—Miller County

Drilling activity has fallen off somewhat in the Miller County, Arkansas, sector of Rodessa, since the decreased takings of pipe lines and lowered proration of the Arkansas Board of Conservation. During the past week, daily average crude runs were 8,810 bbls.

Roberts Bros. brought in No. 1-B Capps in the center of section 10-20-28. It flowed 40 bbls. per hour through a half-inch choke, with casing pressure of 350 pounds, and total depth 6,127 feet. Porous lime was cored at 6,110-24 feet and 5½-inch casing was set at 6,099 feet.

A second producer was brought in on gas lift, being J. R. Ostrom No. 1 J. O. Gerrald, in the E half of fractional section 15-20-28. The well is making 25 bbls. per day with total depth at 6,079 feet.

Claiborne Parish

The possibility of a three-quarter mile southwest extension to the Lisbon field in Claiborne Parish was seen when C. R. Schuster No. 1 Sallie Lloyd, SW SW section 2-20-5, cored a reported good saturated section. The test has 5½-inch casing set at 5,271 feet.

In the field, E. W. Gill No. 2 English, C S half NW SE section 29-21-4, was completed for 73 bbls. per hour on a half-inch choke, after acidizing. Tubing pressure was recorded at 300 pounds. Total depth is 5,168 feet.

Across the line in Lincoln Parish, the Magnolia Petroleum Co. brought in No. 2-B Corbin, C S half NW NW section 5-20-4, for an initial production of 37 bbls. per hour on a half-inch choke. Saturated lime was cored at 5,263-69 and 5,275-78 feet and total depth is 5,281 feet. Tubing pressure was 300 pounds.

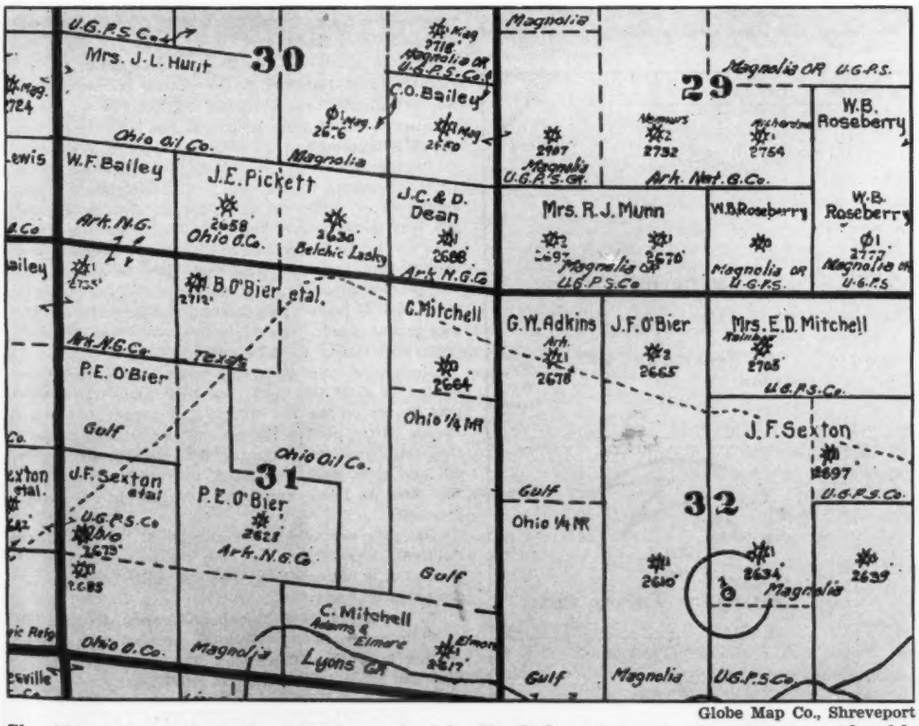
Southwest of the field, McClanahan No. 1 Lewis, in W half SW SE section 25-20-7, was temporarily abandoned at 5,507 feet.

La Salle Parish

The Urania field of northwestern La Salle Parish gained a small producer as Georgetown Oil Co. No. 1 Baldridge, NW cor. NE NW section 11-9-1e, came in on the pump making 40 bbls. per day at total depth of 1,512 feet.

In the southern Bull Bayou district of the same parish, Petroleum Heat & Power Co. No. 1 Russell

(Continued on Page 119)



Globe Map Co., Shreveport

The Shongaloo gas field of Webster Parish, North Louisiana, is attracting considerable attention, as the Magnolia Petroleum Co. progresses in its deep test, No. 1 Sexton Unit, NW SE section 32-23-9. The test is now below 7,000 feet

Texas and Louisiana Gulf

By
NEIL WILLIAMS

New Cockfield Sand Pool in Northwestern Harris County

HOUSTON, Tex., Jan. 17. — Amerada Petroleum Corp. and Stanolind Oil & Gas Co. opened Texas Gulf Coast's first oil field of the year with the completion of No. 1 E. M. Mills, 3 miles northeast of the Satsuma field, northwestern Harris County. Bottomed in salt water in the Cockfield formation at 6,863 feet, production was obtained by perforating the casing at 6,838-52 feet. After it had cleaned the hole of wash water, it flowed an initial gauge of 24 bbls. of 38-gravity oil per hour through a quarter-inch choke with tubing pressure 1,100 pounds and casing pressure 1,600 pounds.

While the discovery well is located only a short distance from the Satsuma field, it will no doubt be classified as a new pool and named Fairbanks. Although No. 1 Mills is producing from the same formation found at Satsuma, core records show a much thicker sand section than Satsuma, which averages from 20 to 25 feet. It is generally assumed that the two fields represent two highs on the same structure and that production will be separated by a fault or "graben" condition.

Glenn H. McCarthy No. 1 Hebert & Broussard, in the Cheek area, Jefferson County, still remains in the doubtful class as it continues to show salt water. A third production test was made at the close of the week through perforated casing at 7,718-27 feet, and the well was brought in flowing an estimated 6 bbls. of fluid per hour of which 40 per cent was wash water having a brackish taste. It is reported that the salt water content continues to rise. It was flowing through a one-eighth inch choke, having a casing pressure of 1,400 pounds. Gravity of the oil is 35 degrees. The well is expected to be killed and the casing reperforated.

Deeper drilling in the Palacios field, Matagorda County, is predicted for the 9,200-foot sand, which blew out, igniting Sun Oil Co. No. 1 Bayshore Farm, Inc., on January 4. The well made one large head of mud and shale which extinguished the fire on January 8. On January 9, a specially constructed 10,000-pound christmastree was connected to the 9⅝-inch casing and the well is flowing 250 bbls. of high gravity distillate per day through a three-quarter inch casing choke with casing pressure 2,200 pounds. Production is through perforated casing at 9,245-75 feet. This is the first important production developed out of five completed wells. Three were abandoned.

In the same county and located 2½ miles south of the town of McCroskey, I.&G.N. Survey No. 7, Pierce Estate No. 1 fee, drilled into salt water sand at a total depth of 7,374 feet and the hole is being plugged back to 6,200 feet, preparatory to sidetracking and recoring the section at 6,626-32 feet, where a good section of sand was logged in the original hole.

The shallow sand in the Clinton field, Harris County, failed to pay off in commercial quantities at Stanolind Oil & Gas Co. No. 1 A. S. Moody. Perforations were made at 3,602-05 feet and the well is flowing dry gas along with some salt water through a three-sixteenths inch choke. It will no doubt be killed and recompleted. Same company's No. 1 M. E. Oates, the discovery well of this new sand, was officially completed for 32 bbls. of fluid, 22 per cent of which was sediment and water.

Gulf Oil Corp. has made location in the Cleveland field, Liberty County, for a 9,500-foot test. It is No. 21 Kirby Lumber Co., located 1,200 feet south of the No. 14-C Kirby, in the John Pleasants Survey. The drilling of this test will attract wide attention as it will be the first of its kind to be drilled in any of the fields along the Conroe trend and will have the Cook Mountain formation as its objective, the same formation which was proven productive the past year at Spurger in Tyler County and Villa Platte in Evangeline Parish, Coastal Louisiana.

One and a half miles west of the discovery well of the Katy field, Waller County, Stanolind Oil & Gas Co. No. 1 Security Trust Co. is shut down awaiting orders, after showing salt water on a production test through perforated casing at 7,408-13 feet.

Little chance was given Sam E. Wilson No. 1 Mills, which is attempting to extend production in the Hastings field 1 mile south into Galveston County. Late in the week it was drilling below 5,800 feet and based on geological markers was too low structurally to produce.

In the Kubella area of the Pickett Ridge field, Wharton County, Great Plains Oil Co. and others No. 1 Bishkin & Meyers, section 24, I.&G.N. Survey, flowed 38 bbls. in a 12-hour gauge through a one-eighth inch choke, with tubing pressure 1,200 pounds and casing pressure 1,800 pounds. The completion was made through perforated casing 4,579-85 feet. It extends production several hundred feet to the southeast.

In the Old Batson field, another Cockfield producer was added, with the completion of John Deering No. 5 W. W. Cruse, completed in a screen setting from 5,499-5,536 feet, for an initial production of 442 bbls. per day through a quarter-inch choke.

Continental Oil Co. No. 1 Faye, a wildcat in Jefferson Davis Parish, was holding the attention of operators in Coastal Louisiana, due to an attempted blow out at 10,923-35 feet. The drill stem became stuck and the progress of the well is expected to be delayed several days. The well is located on a geophysical prospect in section 31-10s-3w and is one of the deepest holes drilled in the parish.

Union Sulphur Co. killed No. 1 Calcasieu National Bank, the discovery well of the Woodlawn field, Jefferson Davis Parish. The well has been flowing from 45 to 55 bbls. of 50-gravity distillate per day, and it is being killed to reperforate the casing in an attempt to increase the flow. It was brought in through perforated casing at 8,276-91 feet.

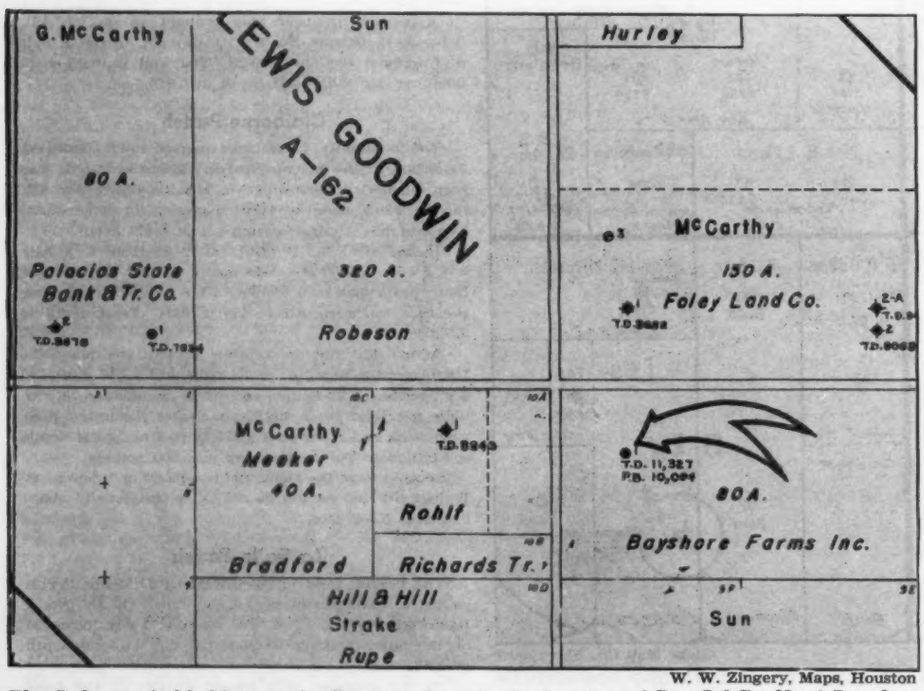
On the Little Chenier Prospect, Cameron Parish, Humble Oil & Refining Co. is moving in material for No. 1-B Miami Corp., C SE SE section 7-14s-6w, about 6 miles west of the company's No. 1 Miami Corp. which is bottomed in a sidetracked hole at 8,499 feet.

On the Jefferson Island dome, Iberia Parish, Texas Co. is preparing to drill No. 1 Bayless-Jones, 225 feet southwest of Jefferson Lake Oil Co. No. 2 fee and 260 feet southeast of No. 1 fee, in section 58-12s-5e. This will be an interesting test, as much attention was attracted to the dome the past year as a result of the performance of Jefferson Lake Oil Co. No. 414 State, which flowed pipe line oil for several days before going dead. The showing was made through perforated casing 6,560-75 feet.

Mechanical trouble continues to retard final completion of Gulf Oil Corp. No. 3-PP State, a possible pool opener on the Timbalier Bay Prospect, Lafourche Parish. After perforating the casting at 6,955-62 feet, the well began to clean itself, showing considerable oil, and then went dead after the screen sanded up. The hole is being swabbed. Location is in section 35-23s-21e.

One mile northwest of production in the Jeanerette field, St. Mary Parish, Herton Oil Co. No. 1 Teche Sugar Co. is bottomed at 9,890 feet with 7-inch casing cemented at 9,884 feet.

In the Lirette field, Terrebonne Parish, Humble Oil & Refining Co. No. 1 Wurzlow, section 6-19s-19e, is drilling in shale at 9,614 feet. The well attempted to blow out after drilling plug at 9,027 feet.



W. W. Zingery, Maps, Houston

The Palacios field, Matagorda County, showing the location of Sun Oil Co. No. 1 Bayshore Farm, which has opened a deep sand at 9,245 feet

COMPLETIONS—TEXAS COAST

Completions of the week with pay sand record, or total depth, and initial 24-hour production follows:

(Continued on Page 146)

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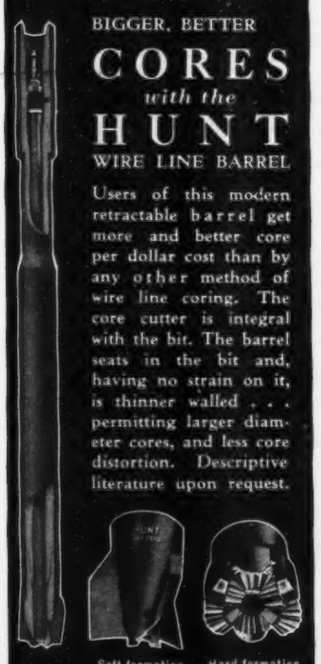

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Among Gulf Coast Drilling Contractors

Housh, Schofield and Thompson are moving a rotary to northwestern Chambers County for a wildcat to be drilled for Laverne Decker.

Rutherford Drilling Co. has entered the recently opened West Saxet field Nueces County where No. 1 L. A. Stewart will be drilled for his associated company, Rutherford Oil Corp. The test is situated about 3,500 feet southwest of the discovery well in the J. K. Dennan Survey. Contract was received from the Skelly Oil Co. for another test on the First National Bank lease in the Van Vleck field. Matagorda County where he is already operating one rig at No. 14-B Cobb which is drilling below 11,000 feet.

Trinity Drillers, Inc. of Corpus Christi received contract from the Lincoln Oil Co. for No. 1 State to be drilled in Red Fish Bay, about 4½ miles southwest of Aransas Pass. Construction of an "island" to support the drilling equipment is scheduled to get underway within the next two weeks. This company completed the discovery well of the West Saxet field, Nueces County and additional contracts are expected to be received in the near future as an early development program is planned.

O. W. Dyer has opened another deep seated field in the Rio Grande Valley area, with the completion of Atlantic Refining Co. No. 1 American Rio Grande, located 3½ miles southwest of Weslaco in Hidalgo County. Perforations were made in the casing at 8,995-9,005 feet, and the well is flowing an unestimated amount of high gravity distillate along with considerable wash water. Other operations continue for the same company at McCampbell, Aransas County, Dickinson, Galveston County and Hardin in Liberty County.

Cron & Gracey received contract from Stanolind Oil & Gas Co. for No. 1 C. S. Jurgens, Tomball field, Harris County; have one test drilling below 10,000 feet at Lake Long in Coastal Louisiana, for the Fohs Oil Co. and are nearing the pay horizon at Gibson for Shell Petroleum Corp. Two other operations are reported at Flour Bluff and Dickinson fields for Humble Oil & Refining Co. and Stanolind Oil & Gas Co.

George Echols has completed his No. 7 Bennett at the Heyser field for a good producer and is moving the rig to No. 4 Landers. He has one rotary running in the field for Sinclair Prairie Oil Co. on the Bennett lease; one at Jefferson in Marion County for the Fohs Oil Co. and is drilling below 5,200 feet on his No. 1 Dunseth, an interesting wildcat northwest of the Heyser field in the Frances Perez Survey, Victoria County.

Continental Oil Co. No. 1 Faye, a wildcat in Coastal Louisiana, being drilled by Nicklos Drilling Co. was holding the attention of operators in that area, due to an attempted blow out at 10,923-35 feet. It has not been determined whether the blow out occured from the Cook Mountain formation, the same horizon that was opened by the company the past year. The well is situated approximately 6 miles southwest of Jennings in the southwestern part of the parish and is one of the deepest tests ever drilled in that area. Drilling continues at Valentine with three rigs for the Pan American Production Co. while another outfit is being used on a workover job for the Continental Oil at Tepetate.

Thirty new operations were reported for the Texas sector of the Gulf Coast district the past week. All were field locations, the largest group being made in the deep Dickinson field. Operators reporting new locations included Atlantic Refining Co. F. W. Bennett, Humble Oil & Refining Co. J. K. Hughes and Pure Oil Co. Other field locations were made at Anahuac by Gulf Oil Corp. Barbers Hill by Atlantic Refining Co. Seabreeze by Sun Oil Co. Silsbee, by Republic Production Co.; Cleveland, Gulf Oil Corp.; Hardin, Jack Frazier and Gulf Oil Corp.; Segno, Gulf Oil Corp.; Danbury, Rowan Drilling Co.; Hastings, Stanolind Oil & Gas Co.; Manvel, Texas Co.; Old Ocean, Harrison and Abercrombie; Sandy Point Florence Investment Co.; West Columbia, Sterling Oil & Refining Co.; Orchard, Gulf Oil Corp.; Thompson, Naylor Oil Co.; and in Friendswood by Humble Oil & Refining Co., Skelly Oil Co. and Texas Co.

Operators interested in the La Blanca field, Hidalgo County were watching the progress of the fire fighters who are attempting to control two burning wells that blew out and cratered the first part of the week. The original fire started from an abandoned hole, drilled to a total depth of approximately 7,800 feet by D. Davenport on the C. H. Swallow lease. The heat from the well melted the connections on the same operators No. 1-A Swallow, about 100 feet from the abandoned hole, and the crater from both wells is said to cover a large area. In order to relieve some of the pressure, the Railroad Commission recalled it's order of two weeks ago which closed in all producers in the field that were not furnishing gas to domestic consumers. Until the two burning wells are brought under control, operators will be allowed to flow the wells to 25 per cent of their open potential. Seven producers have been completed in the field. Six are producing from the "McDougal" sand at 7,850-79 feet while one is producing from the Engleman sand around 6,600 feet.

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California Field Report

By
L. P. STOCKMAN

Wilmington Terminal Zone Is Cut Off on the Southeast

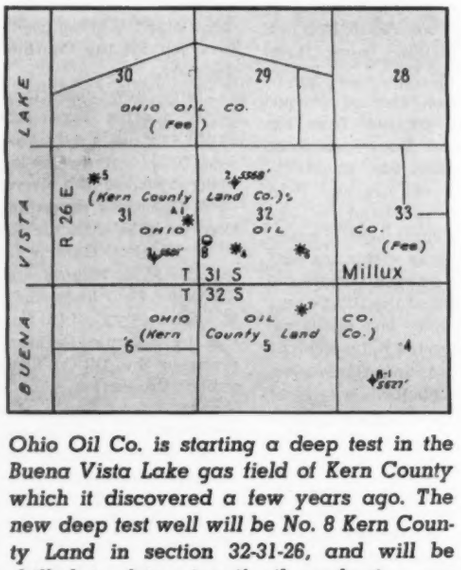
LOS ANGELES, Calif., Jan. 17.—Allied Petroleum Corp. appears to have defined the southeastern limits of production in the Harbor section of the Wilmington field as far as the highly productive Terminal zone is concerned as its No. 23 encountered water from top to bottom in the interval where the Terminal zone should have been. No tangible evidence of faulting was found, although the shale member below the Ranger zone was badly crushed and broken and was found in a horizontal position instead of showing the usual structural dip. Very little data are available with respect to the possible existence of a fault between this well and Superior Oil Co. No. 1960-1 Community and General Petroleum Corp. No. 2 S.P. which are drilling in the Terminal zone, and the limited information available tends to indicate the Terminal zone instead of reflecting a faulted condition simply pinches out west of the Allied Petroleum Corp. location. This hypothesis is supported by the fact that Allied Petroleum Corp. actually encountered the upper or Ranger zone and will make an attempt to produce this zone in No. 23. This well was carried to 3,225 feet but upon failing to find the Terminal zone was plugged back to 2,990 feet and the hole finished with an 8⅝-inch liner carrying 390 feet of perforated. A production test of the Ranger zone will be made within a few days.

Failure of Allied Petroleum Corp. No. 23 to show commercial production in the Terminal zone indicates the town lot area in the southeastern end of the field will probably be found unproductive. If the productive limits of the Terminal zone have been defined by this well, either as a result of faulting or pinching out of the zone, it will preclude development of commercial production in the town lot area and reduce the number of wells to be drilled as well as eliminating the necessity of costly offsetting. Superior Oil Co. No. 1960-1 Community, on a community lease in which the city of Long Beach owns 62 per cent of the aggregate, is showing a lot of kick in the Terminal zone and should result in substantial production upon completion. This well is about 4,000 feet east of production on the Ford lease of General Petroleum Corp. and if it comes up to expectations will result in aggressive development in the intervening area.

Nearing Completion

Superior Oil Co. No. 1960-1 Community in the southeastern end of the Wilmington field is rotating in the Terminal zone at 3,975 feet and core recoveries indicate a sand of good texture and high saturation. General Petroleum Corp. No. 1 Harbor Community at 3,996 feet, No. 6 Harbor Community at 3,940 feet and No. 2 S.P. at 3,755 feet west of Allied Petroleum No. 23 are all coring in the Terminal zone. No. 6 Harbor Community already has a penetration of 1,047 feet in the Terminal zone of which about 85 per cent is oil sand. General Petroleum Corp. is completing No. 1 Blinn and No. 3 Channel Community in the Ranger zone and should have them tanking oil within 24 hours. No. 1 Blinn, drilled to 3,464 feet, has been plugged back to 3,295 feet and the hole finished with 411 feet of 6⅝-inch liner including 315 feet of 50-mesh screen. No. 3 Channel Community was drilled to 3,352 feet but failing to encounter the Terminal zone, has been plugged back to the Ranger zone at 3,190 feet and the hole finished with 385 feet of 6⅝-inch liner including 334 feet of 50-mesh screen. Richfield Oil Corp. is making preparations to complete No. 1 Gurnsey in the Ranger zone at 3,000 feet and will run in and cement a string of 8⅝-inch casing at about 2,630 feet.

Three wells were completed in the Wilmington field during the week. Colter & McAdoo completed two wells and added 478 bbls. to their daily production. These were Nos. 2 and 3, the former completed flowing 228 bbls. of 16.1-gravity from 3,650 feet and the latter flowing 270 bbls. of 15.9-gravity from 3,645 feet. No. 3 was finished with 740 feet of 8⅝-inch liner including 700 feet of perforated landed at 3,642 feet. Wilmington Oil & Development Co. No. 2-W was completed flowing 190 bbls. of 27.1-gravity from the lower Terminal zone at 5,703 feet after the hole had been finished with a 7-inch liner, including 108 feet of perforated, and cemented through perforations at 5,595 feet. The well was brought in flowing through



Ohio Oil Co. is starting a deep test in the Buena Vista Lake gas field of Kern County which it discovered a few years ago. The new deep test well will be No. 8 Kern County Land in section 32-31-26, and will be drilled to determine if oil production can be developed in this gas field.

a 1-inch bean and showed a tubing pressure of 130 pounds and a casing pressure of 380 pounds. Macson Oil Co. has concluded drilling No. 55-C at 3,638 feet and after running in 823 feet of 7-inch liner including 666 feet of perforated, started gravel packing behind the liner. On a bid of 50 per cent royalty and a cash bonus of $27,000, Westgate-Greenland Oil Co. has been awarded a contract to drill a 4-acre tract in the Harbor area owned by the city of Long Beach. This is the first contract awarded by the Harbor Commission which recently requested bids on a total of 160 acres of land owned by the city within the area now open for development.

New Gas Field

Ohio Oil Co. appears to have discovered a commercial gas field near the town of Willows in the upper Sacramento Valley in Glenn County, although its discovery well, No. 1 Willard in section 18-20-2, was lost when it blew in out of control while the crew was coming out of the hole with drill pipe. The well which blew in flowing at an estimated rate of 100,000,000 feet of dry gas from 4,495 feet did not take fire but the ensuing crater which formed within a relatively short time engulfed the derrick, equipment and two automobiles. The well soon after the gas flow had decreased began making 50,000 bbls. of water daily and required erection of dikes to keep it under control. This is one of the largest gas wells found in California since the search for natural gas fields began several years ago subsequent to discovery of the Buttonwillow gas field by Seaboard Oil Co. then operating as Milham Exploration Co. No plans for additional development of the probable new gas field near Willows have been formulated but it is likely further exploration work will get under way soon. The Willows structure was discovered by reflection seismograph and is expected to embrace several hundred acres. If it is proved as commercially productive the Willows field will be the most northerly productive area in the state. Up to the present commercial gas fields have been discovered at Buttonwillow, Buena Vista Lake, Semi-Tropic and Delano in Kern County, Goleta in Santa Barbara County, McDonald Island and Tracy in San Joaquin County and Rio Vista in Solano County. In the Rio Vista field, Tracy Drilling Co. found it necessary to undertake some corrective work on No. 1 Hanson, a recent completion, which established a potential daily production of 40,000,000 feet. Shortly after completion, gas began coming up to the surface around the derrick but the company solved this problem by killing the well and forcing cement up around the casing to the surface.

Santa Maria

Drilling operations in the Santa Maria Valley field are still increasing from week to week and will show a further gain during the next fortnight as seven additional permits were granted by the California State Mining Bureau. No. 3 Hopkins, a joint well of Hancock Oil Co. and R. R. Bush Oil Co., headed the completion list during the week flowing 1,650 bbls. of clean 16.3-gravity oil per day from 4,860 feet. These two operators have concluded drilling operations on No. 2 California Lands in section 30-10-33 which was carried down to 4,353 feet and subsequently redrilled to 4,312 feet and finished with 1,092 feet of 6⅝-inch liner including 1,044 feet of perforated landed at 4,306 feet. Pumping equipment is being rigged up. In the Beacon area Dugan Oil Co. completed No. 1 Yelkin flowing 1,520 bbls. of 15.5-gravity from 4,683 feet.

Union Oil Co.'s southernmost well in the Santa Maria Valley field, No. 2 Bradley Lands, has been completed flowing 617 bbls. of 15.2-gravity from 5,017 feet. This well, which was brought in flowing through a 1-inch bean, was finished with 767 feet of 6⅝-inch liner including 742 feet of perforated and shows 100 pounds pressure on the tubing and 400 pounds on the casing. In the west side area Union has concluded drilling operations on No. 1 Acquistapace in section 22-10-34, in the Franciscan basement at 4,361 feet and is making preparations for an early production test. This well offsets George F. Getty No. 1 Vincente and No. 1 Wheat of Union Oil Co. E. H. Moore, Inc., has abandoned No. 10-L in section 30-10-34, as a dry hole at 6,431 feet. Top of the Monterey was logged at 6,144 feet and top of the Santa Margarita at 6,112 feet. A recent formation test of 30 minutes' duration at 6,145-6,243 feet was unfavorable as the recovery was almost entirely of mud. No. 2 Jones-Gallison of California Lands, Inc., in close proximity to No. 1, a recent completion, is correlating 177 feet lower structurally and may therefore show a somewhat smaller production.

Kettleman Hills

Kettleman North Dome Association has given up the fishing job in No. 4-18-J in section 18-21-17 and will endeavor to complete the test in the Eocene. The hole, which has a total depth of 11,746 feet, has been cleaned out to 10,860 feet and a cement plug put in bottom to bring the effective depth up to 10,810 feet. The crew then ran in 125 feet of 4¾-inch liner including 37 feet of perforated landed on top of the cement plug. On a swabbing test the well showed water entering the well through a hole in the casing at 8,440-46 feet and a squeeze job was effected on the 6⅝-inch casing at that point. This well, which proved the Eocene production in the western end of

the structure, was given its first test in July, 1937, before it was deepened and flowed 1,200 bbls. of 34.5-gravity from 10,753 feet with the 4¾-inch liner froze at 10,733 feet. No. 4-18-J should be ready for a production test within a few days. During the latter part of the week Kenda completed No. 27-12-P in section 12-22-17 flowing 1,234 bbls. of 36.7-gravity and 2,700,000 feet of gas per day from 8,060 feet. This well was finished with a 6⅝-inch liner carrying perforations at 7,059-7,994 feet.

Greeley

Standard Oil Co. completed two small wells in the Greeley field of Kern County. No. 11-8-A in section 18-29-26 in the northwest end was completed, flowing 280 bbls. of 28.9-gravity oil, cutting 3 per cent, from 7,846 feet. This well, flowing through a one-half inch bean, has a 7-inch water string landed at 7,800 feet and the hole was finished with 63 feet of 5-inch liner including 31 feet of 60-mesh screen landed at 7,844 feet. Standard No. 11-11 Kern County Land in the eastern end in section 17-29-26 has been completed flowing 220 bbls. of 34.1-gravity oil from 7,810 feet through a 30/64-inch bean under a tubing pressure of 110 pounds and a casing pressure of 400 pounds. It was finished with 93 feet of 5-inch liner, including 60 feet of 60-mesh. No. 11-8-A is flowing 111,000 feet of gas in addition to the oil and No. 11-11 is making 348,000 feet daily. No. 17-1 Kern County Land, the most northeasterly well in the Greeley field, has been abandoned by Standard Oil Co. as a duster at 8,500 feet. Plans had been made to deepen this outpost to the Rio Bravo sand but the recent unfavorable showing of Superior Oil Co. No. 1 Krause in the eastern end has apparently changed original plans. Superior Oil Co. has suspended drilling operations on No. 1 Krause at 8,178 feet pending additional developments. In the Bellevue or Jastro area about 5 miles southeast of the Greeley field, Shell Oil Co. has staked location for a wildcat in the SW cor. section 29-29-27. This wildcat, No. 58-29-A, is about 7,500 feet northeast of a wildcat drilled by Shell in 1937 with unfavorable results. Shell's new wildcat is about 3 miles northeast of Superior Oil Co.'s wildcat operations in section 3-30-27.

Round Mountain

Two new completions were chalked up in the Round Mountain field of Kern County and a check of development work indicates the probable completion of two additional producers within 10 days. Shell Oil Co. No. 19 Caldwell in section 7-28-29 on a potential production test following completion at 1,784 feet pumped 294 bbls. of 14.7-gravity. This well was originally carried to 1,835 feet but ran into bottom water and was plugged back to completion depth. Shell's next producer should be No. 2 Olcese-Lilly in section 21-28-29 as it is going ahead in the pay at 1,905 feet. In section 8-28-29, Crestmont Oil Co. finished No. 2 Staley pumping 286 bbls. of 16.3-gravity from 1,780 feet. This well, which picked up the top of the productive Vedder zone at 1,759 feet, was finished with 63 feet of 6⅝-inch liner, including 21 feet of 80-mesh, landed on bottom. Eastmont Oil Co. has its No. 5 Olcese in the East Round Mountain field ready for a production test following completion of drilling operations at 1,775 feet.

Fruitvale

Pacific Oil & Gas Co. extended the northern limits of the Fruitvale field of Kern County by completing No. 1 Fanucchi in section 14-29-27 doing 320 bbls. of 18.1-gravity from 3,017 feet and will probably stimulate additional drilling. While this development has been going on in the northern end, Western Gulf Oil Co. has been busy for several months extending the productive limits in the southern end. Western Gulf Oil Co.'s last completion in the southern end was No. 10 Red Ribbon in section 27-29-27 brought in flowing 543 bbls. of 17.2-gravity in November, 1937, from 3,543 feet while the company's latest completion in the northern end was No. 30 Kern County Land in section 14-29-27 which was brought in flowing 450 bbls. of 17.8-gravity in December, 1937, from 3,070 feet. Western Gulf has just spudded in No. 31-B Kern County Land in section 14-29-27 and should have it ready for a production test in a few weeks. It appears likely drilling operations will show an increase in the Fruitvale field within 30 days as there are a number of small leases in close proximity to the new well of Pacific Oil & Gas Co.

El Segundo

Howard Oil Co. appears to have defined the northern limits of production in the El Segundo field of Los Angeles Basin as it has abandoned No. 1 El Segundo as a dry hole at 7,570 feet. This northern outpost topped conglomerate at 7,530 feet but it was wet from this point to the Schist basement. Late in the week Richfield Oil Co. completed No. 2 McCray flowing 840 bbls. of relatively clean 21.9-gravity from 7,354 feet. This well flowed through a 1½-inch bean under a tubing pressure of 130 pounds and a casing pressure of 530 pounds. Wilshire Oil Co., which has completed two producing wells in the El Segundo field, is making hole in No. 2 Security at 6,877 feet and in No. 2-1 Elsie at 6,910 feet. The company's No. 1 El Segundo Construction Co. was spudded early in January and will not be completed for another month. The last two wells drilled by Wilshire Oil Co. in the El Segundo field were drilled from spud to completion in a little less than five weeks. Sunshine Oil Co. completed another well in the El Segundo field when No. 1 Grauman-Wallace was returned to production after being cleaned out to bottom, 7,195 feet, flowing 590 bbls. of relatively clean 23.7-gravity. This well was given a preliminary production test a few weeks ago.

San Joaquin Basin

In the Buena Vista Lake gas field of Kern County, Ohio Oil Co. has erected a 164-foot derrick over No. 8-A Kern County Land in section 32-31-26 to facilitate going in and coming out of the hole. This well will be carried for a test of the Rio Bravo sand found

(Continued on Page 130)

North Louisiana Fields

(Continued from Page 115)

was completed for 200 bbls. per day, with 40 bbls. of salt water, on the pump, at a total depth of 1,531 feet. The well is in Lot 7, NW cor. NW SE SE section 26-10-1e.

Webster Parish

Magnolia Petroleum Co. added a producer in the deep Bodcaw sand in Cotton Valley. No. 1 Crichton Heirs, NE NW section 33-21-10, came in making 611 bbls. per day of distillate, and an estimated 7,000,000 feet of gas. Seven-inch casing was set at 8,304 feet, and total depth is 8,332 feet. The gauge on a seven-sixteenths inch choke showed tubing pressure of 2,625 pounds and casing pressure of 2,875 pounds.

Following the extension of the Holloway sand in the field last week by Ray Drilling Co. No. 1 Stewart at 5,791-5,804 feet, a third test is now in the sand. A. G. Oliphant No. 1 Hodges, NW section 34-21-10, topped the Holloway at 5,650 feet and reported a show of oil in 12 feet of the sand section. The test is shut down awaiting orders at total depth of 5,672 feet.

Shuler Field, Arkansas

Outstanding field in Arkansas is the Shuler area of Union County, showing indications of becoming one of the major discoveries of the entire tristate district. Considerable drilling activity is under way in the field, with wells drilling for the Jones sand at 7,500 feet and the Reynolds lime immediately below it.

An important result was the topping of the Jones sand in Phillips Petroleum Co. No. 2 Justiss, NW section 18-18-17, on the northwest edge of present production. The well topped the Jones sand at 7,507 feet, or minus 7,257 feet subsea, making it the highest well structurally in the field to date. This indicates that the structure will extend a considerable distance to the northwest of present activity, greatly enhancing the outlook at Shuler.

Thus far, the Jones sand, principal producing horizon, has shown no indications of limits, and all wells in that sand in the field are making their 400-bbl.-per-day allowable considerably pinched down.

During the week, two producers were brought in, both in the Jones sand. Lion Oil Refining Co. No. 1-C Morgan, in NE SE SE section 18-18-17, made an initial production of 1,487 bbls. on a 28/64-inch choke with casing pressure of 875 pounds and tubing pressure of 850 pounds. Perforations were shot at 7,528-56 feet and total depth is 7,804 feet.

Phillips Petroleum Co. No. 1 Jennings, NW SW NE section 18-18-17, made 55 bbls. per hour on a 40/64-inch choke with tubing pressure of 760 pounds and casing pressure of 500 pounds. Total depth is 7,733 feet.

Numerous scattered wildcats in North Louisiana attracted attention of interested operators during the week. In Webster Parish, in the Shongaloo gas field, the Magnolia Petroleum Co. No. 1 Sexton Unit, a deep test, is drilling below 7,000 feet.

In Morehouse Parish, the W. J. Furlong No. 1 Clark, section 10-20-7e, is drilling shale below 5,400 feet.

Claiborne Parish's important deep test, Union Producers Co. and Standard Oil Co. of Louisiana No. 2 Brownfield, in the Sugar Creek area, cored sands with good odor at 8,752-70 feet, fair odor at 8,770-78 feet and was last reported coring hard sand at 8,802 feet.

Estimated Daily Production

Estimated daily gross production all companies week ending January 15:

NORTH LOUISIANA

	Bbls.
Bellevue	740
Caddo light	3,850
Caddo heavy	2,455
Converse	620
Cotton Valley heavy	305
Cotton Valley light	*3,750
De Soto and Red River	1,440
Elm Grove	360
Haynesville	3,025
Holly	100
Homer	2,485
Lisbon	11,500
Pleasant Hill	115
Rodessa	44,140
Sarepta-Carterville	295
Sligo	330
Sugar Creek	320
Urania	2,890
Zwolle	765
Total	79,485

SOUTH ARKANSAS

Buckner	405
Champagnolle	1,235
El Dorado	1,825
Lisbon	280
Miller County	405
Nevada	675
Rodessa	8,810
Shuler	8,190
Smackover light	1,980
Smackover heavy	14,300
Stephens	540
Troy	1,200
Urbana	1,210
Total	41,055

Texas side of Rodessa field 19,535 bbls. daily.

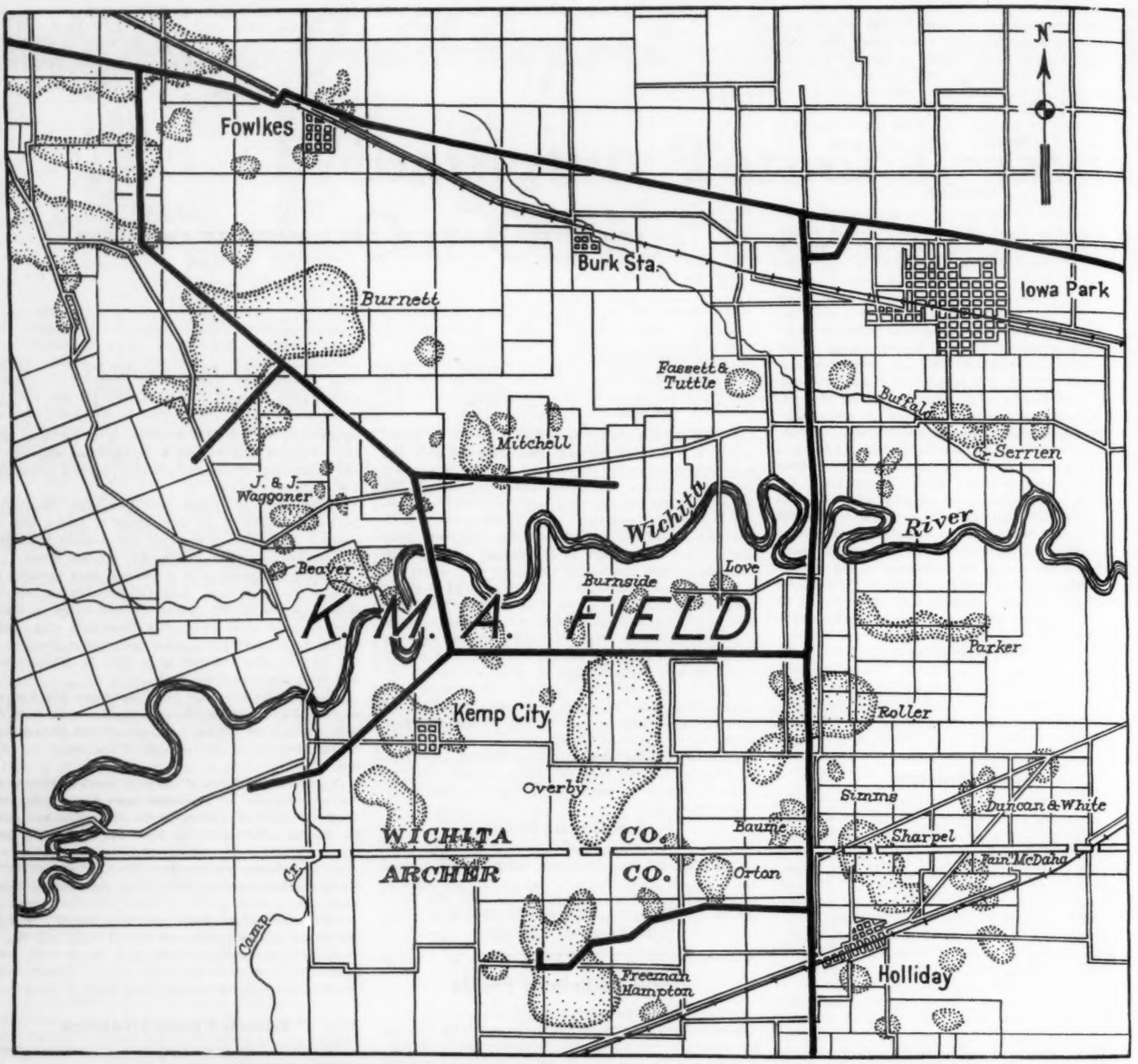
*3,270 bbls. is distillate.

TANKER SHIPMENTS FROM LOS ANGELES TO DOMESTIC AND FOREIGN PORTS

	January 7		December 31			
Intercoastal-domestic:	Total this week	Daily average	Total last week	Daily average	This year to date	Same time last year
Gasoline	.....	.....	52,521	7,503	.....	.....
Kerosene	.....	.....	72,634	10,376	.....	.....
Foreign exports:						
Crude oil	123,496	17,642	899,728	128,533	123,496	40,918
Fuel oil	.....	.....	417,362	59,623	.....	73,907
Diesel and gas oil	82,125	11,732	209,959	29,994	82,125	326,024
Gasoline	79,846	11,407	29,743	4,249	79,846	11,274
Kerosene	108,510	15,501	.....	.....	108,510	.....
Coastwise-domestic:						
Crude oil	139,042	19,863	400,136	57,162	139,042	64,749
Fuel oil	405,530	57,933	93,253	13,322	405,530	.....
Diesel and gas oil	43,789	6,256	38,807	5,544	43,789	9,640
Gasoline	433,371	61,910	303,292	43,327	433,371	292,032
Kerosene	6,706	958	42,168	6,024	6,706	.....

TANKER SHIPMENTS FROM SAN FRANCISCO TO DOMESTIC AND FOREIGN PORTS

Intercoastal-domestic:						
Diesel and gas oil	.....	.....	76,265	10,895	.....	.....
Foreign exports:						
Crude oil	.....	.....	158,496	22,642	.....	.....
Fuel oil	.....	.....	49,345	7,049	.....	.....
Diesel and gas oil	.....	.....	86,760	12,394	.....	.....
Gasoline	.....	.....	145,180	20,740	.....	.....
Kerosene	.....	.....	11,385	1,626	.....	.....
Lubricants	.....	.....	63,136	9,019	.....	.....
Coastwise-domestic:						
Fuel oil	169,782	24,255	65,979	9,417	169,782	121,686
Diesel and gas oil	39,416	5,631	25,170	3,596	39,416	39,212
Gasoline	198,311	28,330	264,169	37,738	198,311	198,714
Kerosene	18,140	2,591	34,126	4,875	18,140	3,367



ABOVE MAP (SEE BOLD BLACK LINES) SHOWS NATURAL GAS PIPE LINES OF UNITED GAS PIPE LINE COMPANY IN K.M.A. FIELD

ATTENTION! K. M. A. DRILLERS!

NATURAL GAS

IS NOW AVAILABLE IN THE K. M. A. FIELD

USE NATURAL GAS....

- No expensive hauling of fuel!
- No drilling delays necessary!
- Natural Gas is economical fuel!
- It's cleaner—Easy to install!

Study the above map and then call M. A. Reagan, Telephone 7379 Wichita Falls, or ask any United Gas Pipe Line Company employe.

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UNITED GAS
PIPE LINE COMPANY

Central West

By STAFF CORRESPONDENT

Clay and Richland Fields' Good Wells; 18 New Starts

MATTOON, Ill., Jan. 17.—The seven oil wells completed in the past week in the Central Basin fields produced 2,606 bbls. initially. Richland County led in results. Eighteen new operations were started. There were two dry holes finished in the seven-day period. The results of the week's work were as follows:

In Clay County, Pure Oil Co. No. 1 B. Travis B, C S half NW NW section 33-3n-8e, found pay at 2,956-65 feet and at 2,979-82 feet and flowed 760 bbls. in 24 hours. Casing pressure was 250 pounds and tubing pressure 15 pounds.

In Fayette County, Carter Oil Co. completed No. 1 Clow, C E half SW NE section 15-8n-3e, in Benoist sand at 1,486-1,508 feet. This well made an initial production of 90 bbls. of 37-gravity oil, which is being purchased by the Standard Oil Co. of Ohio. It is good for about 40 bbls. a day.

In Marion County, Adams Oil & Gas Co. No. 18 Merryman, CWL SW SW section 21-4n-1e, was completed in Benoist sand at 1,418-41 feet, total depth, and after a 15-quart shot, it made 46 bbls. in 24 hours on the pump.

In Richland County, Pure Oil Co. No. 1 C. T. Montgomery, C E half NW SE section 8-3n-9e, had the Fredonia at 2,932 feet and opened pay from the top to 2,938 feet and at 2,948-53 feet, total depth 3,000 feet. It flowed 634 bbls. in 24 hours.

Pure Oil Co. No. 5 J. O. Coen, C E half NW NW section 9-3n-9e, topped Roseclaire at 2,919 feet and had pay at 2,950-60 feet. It was acidized with 1,000 gallons, and flowed 527 bbls. the first day. The total depth is 2,993 feet.

DeKalb Syndicate No. 1 Flora Home Oil Co., CSL NW SE NE section 17-3n-9e, was good for 483 bbls., natural flow, through casing from pay at 2,947-55 feet, as a result of which several locations were made on the Noble townsite.

Pure Oil Co. No. 1 H. E. Burr, NW cor. NE SW NE section 17-3n-9e, pumped 66 bbls. in 24 hours from pay at 2,974-80 feet and 2,987-92 feet, and was then acidized with 1,000 gallons. It flowed 237 bbls. in the first 24-hour test, then dropped to 75 bbls., and then to 10 bbls. on the third day and stopped flowing.

In Wabash County, Deck & Hayes drilled a failure in No. 1 Provident Mutual, C SE NW section 25-1s-13w, measuring from Indiana principal meridian. It had McClosky lime at 2,363-70 feet, with some saturation, but was abandoned at 2,635 feet.

In Marion County, Valeria Oil Co. No. 1 Schriever, SE cor. NE section 12-4n-1e, was dry and abandoned at 1,900 feet, and Alexander and others No. 1 Pope, NE NE NE section 5-3n-1e, was dry and abandoned at 1,494 feet.

18 New Operations

New work started, or about to start, included the following 18 operations, reported for the first time:

In Clay County, Wiser Oil Co. No. 10 Smith, NE SW NE section 28-3n-3e, had cellar and pits dug, and Pure Oil Co. made a location for No. 1 M. Mitchell, C N half SE SE section 5-2n-8e.

In Clinton County, Shell Petroleum Corp. was moving in material for No. 3 Criley, SW NE NE section 2-1n-1w; Taylor Noll and Max Connery made a location for a wildcat, No. 1 Charles Barth, C NW SE SW section 12-1n-1w, and the Group Oil Co. set 10¾-inch casing at 63 feet in No. 1 Jolliff School lot, SE cor. SW SW section 1-1n-1w.

In Jefferson County, A. H. Carpenter was moving in material for No. 1 Skinner, SW NW NE section 36-4s-2e. Dee & Foltz were building road to location for No. 2 Hamilton, SW SW NW section 20-4s-3e.

In Randolph County, Brennen Oil & Gas Co. made a location for No. 1 Wilson, SE SE SE section 22-6s-6w.

In Marion County, Dalton Oil Co. was building derrick for No. 1 Ira Dalton, NW SE NE section 19-1n-3e.

In McDonough County, O. H. Hammer announces equipment on the ground for No. 1 Frank Jones, S half NW section 22-7n-3w, Sciota Township, and that it should be ready to spud by the time this was written.

In Richland County, Pure Oil Co. had cellar and pits dug for No. 3 Montgomery, C W half NW SE section 8-3n-9e. Derricks are up for Parshall & Graham No. 1 Mamie Miller, SW NE NE section 17-3n-9e; J. C. Potter and others No. 1 Rosenberg, CSL SW SE NE section 17-3n-9e, and Pure Oil Co. No. 2 Dora Hedrick, NE cor. SW SW NE section 17-3n-9e, while cellar and pits are dug for Pure Oil Co. No. 1 Willie Montgomery, SE cor. NW SW NE section 17-3n-9e.

In Wayne County, Pure Oil Co. has cellar and pits dug for No. 4 S. S. Gill, C E half SW NW section 27-2n-8e.

In Washington County, Betterman and others were moving in rotary to start No. 1 Jesse, C SE NE section 16-3s-2w.

In White County, Heidt and others made location for No. 1 C. B. Dagley, C SW NE NW section 22-8s-14w, measuring from Indiana principal meridian.

Over in Indiana, Michel & Nelson made a location for a test on the A. L. Baver farm, NE cor. NW section 22-8s-14w. Felmont Oil Corp. moved in standard tools for No. 1 J. R. Riggs, SW cor. SE NW section 36-8n-9w, Sullivan County, and will drill a 3,500-foot test, if commercial production is not found on the way down. Carter Oil Co. made a location for No. 1 C. E. Lindley, C E half SE SW section 13-8n-11w, Vigo County, and F. A. Lorch made a location for No. 9 fee, SW cor. SE NW SW section 12-6s-4w, Spencer County.

Among the Drilling Wells

M. V. Yeager was drilling at 1,860 feet in No. 1 Robinson, SE SW NW section 17-10n-11w, in Clark County. (The location is measured from the Indiana principal meridian.)

Olson Drilling Co. No. 1 Irwin, C N half SE NW section 12-2n-7e, Clay County, was acidized with 1,000 gallons after finding an oil showing at 3,058-66 feet, total depth, but the swab was lost in the hole and a fishing job followed.

Adams Oil & Gas Co. No. 2 Schmitz, NE SE NE section 2-1n-1w, in Clinton County, was drilling at 900 feet. Shell Petroleum Corp. No. 1 Criley, NW SE NE section 2-1n-1w, made a drill-stem test at 1,205-31 feet, and recovered 240 feet of oil, cut with mud. The bottom 50 feet of mud had a slightly salty taste.

In Cumerland County, Jolly, Hill and others No. 1 Jenkins, SE NE NE section 30-10-9e, was drilling at 2,125 feet.

In Edwards County, Leach Brothers were underreaming 6-inch casing to 2,905 feet in No. 1 Lee, SW NE SE section 11-1s-10e.

Hollis and others No. 1 Haarman, NW SE SW section 32-8n-6e, Effingham County, had McClosky top at 2,443 feet, St. Louis at 2,550 feet, and a showing of oil at 2,665-69 feet. Seven-inch casing was set at 2,650 feet and standard tools were being rigged up to drill in.

Stanolind Oil & Gas Co. set surface pipe at 380 feet in No. 1 Leiner, SW SE NW section 20-7s-4w, Jackson County.

Hoffman No. 1 King, SW NW NW section 20-8n-10e, Jasper County, had McClosky top at 2,567 feet and Salem lime at 2,950 feet, and was cleaning out at 3,050 feet to drill deeper.

Robert E. Markham No. 1 Mitchell (corrected farm name), SW SE SE section 18-5s-3e, Franklin County, had showings of oil and gas at intervals from 2,602 to 2,820 feet and was coring ahead. In the same county, Washburn Petroleum Co. was drilling in slate at 1,830 feet in No. 1 Neal, C E half SE SE section 6-5s-4e.

Marion Oil & Gas Co. was drilling at 1,327 feet in Stein sand, in No. 1 H. E. Wilson, NE NE SE section 18-3n-3e, Marion County. W. C. McBride, Inc., was drilling at 1,180 feet in No. 1 Clow, SW SW SE section 29-2n-1e. R. E. Dalton No. 1 Clifton, NE cor. SE SW section 15-1n-4e, was drilling at 430 feet.

In Randolph County, J. E. Mabee and others No. 1 Wilson, in section 3-4s-5w, topped Trenton lime at 3,135 feet and was drilling at 3,245 feet.

In Richland County, Bur-Kan Oil Co. and others No. 1 Allen, C SW NW section 27-4n-10e, topped McClosky lime at 3,036 feet and set 7-inch casing at 3,025 feet. It had well-saturated porous oolitic lime at 3,035-40 feet, total depth 3,045 feet. Plug was being drilled. Pure Oil Co. No. 7 Palmer-Taylor, C E half NE SE section 5-3n-9e, found Ste. Genevieve lime at 2,910 feet and cored saturation at 2,940-75 feet, total depth 3,000 feet. Casing was being run.

In Wayne County, Texas Co. No. 1 Silverman, C E half SW NW section 16-3s-7e, set 7-inch casing at 3,252 feet and ran 2½-inch tubing. The well flowed 115 bbls. of oil in 20½ hours. It was then acidized with 1,000 gallons.

OHIO

FINDLAY, Ohio, Jan. 17.—Six oil wells, some of them combination oil and gas producers; seven gas wells and four dry holes represented the week's results in the Central Ohio fields. The details follow:

In Licking Township, Licking County, McClay Bros. No. 2 John H. Orr, section 10, is good for 1,500,000 feet of gas from Niagara lime.

In Athens County, Rome Township, Gibson & Ross No. 2 William A. Copeland, section 29, was dry in the Maxon at 925-30 feet, total depth of 1,047 feet.

In Belmont County, Mead Township, Natural Gas Co. of West Virginia No. 2 A. W. McMasters, section 31, made 193,000 feet of gas from Maxon and Berea sands, total depth 1,500 feet.

In Licking County, Hopewell Township, Allen Willey No. 2 Caldwell and Currie, Lot 22, made 75,000 feet of gas and 12 bbls. of oil from the Clinton sand at 2,912-40 feet.

In Lorain County, Avon Township, William Dempsey No. 1 Lawrence Leonard, SW quarter section 12, found the Clinton dry at 2,370-73 feet and it was abandoned.

In Medina County, Homer Township, Edson & Son No. 1 Allen Kreamer, SW quarter section 2, was dry in the Clinton at 2,873-86 feet and was abandoned.

In Monroe County, Washington Township, Scott Oil Co. No. 5 Thomas Scott Heirs, SE quarter section 13, made 2 bbls. oil and 20,000 feet of gas from the Injun sand at 1,275-90 feet.

In Morgan County, Marion Township, North and others No. 36 Hiram H. Croy, Fr. 31, is good for 4 bbls. of oil in the first Cow Run sand at 434-60 feet.

In Muskingum County, Licking Township, Hope Construction & Refining Co. No. 3 Ed Morgan, third quarter, made 42 bbls. of oil the first 24 hours after a shot in the Clinton at 3,195-3,246 feet. In Jackson Township, Lantz & Meade No. 5 Roy Baughman, NW quarter section 16, was dry in the Berea at 736-60 feet.

In Noble County, Seneca Township, Mud Run Oil & Gas Co. No. 2 Elmer Bond, NE quarter section 23, made 26,000 feet of gas from the Berea sand at 1,632-44 feet.

In Perry County, Coal Township, Preston Oil Co. No. 161 Sunday Creek Coal Co., section 36, made 213,000 feet of gas and 25 bbls. of oil naturally from Clinton sand at 3,650-72 feet. In Clayton Township, Preston Oil Co. No. 1 Albert C. Randolph, section 17, made 7 bbls. oil and 120,000 feet of gas naturally

(Continued on Page 146)

Oklahoma Operations

By DAL DALRYMPLE

Garfield Wildcat Checks High With Two Formations Missing

Completion of the Ramsey pool opener in Payne County and starting of three offset wells featured the past week in Oklahoma field activity, but operations elsewhere were not without interest.

The wildcat being drilled southeast of Waukomis in Garfield County at Harry Hollenback and others No. 1 Clark, NW cor. section 34-21-6w, held attention of Oklahoma oil men as it drilled below 7,025 feet in Sylvan shale, looking for Viola lime. It missed Misener sand and Hunton lime sections and found considerably less Mississippi lime than had been expected. Sylvan shale was topped at 6,934 feet. Absence of Misener and Hunton sections makes the well check higher structurally than anticipated, increasing prospects for a producer. There was an active royalty and lease play in the district the past week.

The deep zone of the Fox field, Carter County, was looking up with a second producer completed and a third producer looking better than on first tests. The latter well is Gulf Oil Corp. No. 1 Johnson, C SW NW section 27-2s-3w. The Johnson well was contrary and would not flow on early tests, but after acidizing six times with 41,000 gallons it settled down and was flowing at the rate of 154 bbls. of oil an hour through 1-inch choke on tubing. It flowed 3,430 bbls. of oil in 24 hours, with 8,000,000 feet of gas, the flow increasing in the last three hours. Gravity of the oil was 44 degrees, with casing pressure of 1,100 pounds and tubing pressure of 1,500 pounds.

Wildcat Reports

The first discovery well of 1938 was completed at Mid-Continent Petroleum Corp. and associates No. 1 Ramsey, SW SW NW section 18-18-2e, southwest of Stillwater in Payne County. It was estimated as an 11,000-bbl. well. Production was from Wilcox sand topped at 4,768 feet, total depth 4,795 feet. It flowed 935 bbls. of oil in the first two hours, and on a later test flowed 555 bbls. of oil in one hour, 225 bbls. in the next 25 minutes and was shut in. Afterward, it was opened daily and flowed 500 bbls. of oil in three to four hours through a three-quarters inch casing choke opened seven rounds and was shut in. Gravity of the oil was 43.2 degrees. Bottom-hole temperature was 125 degrees. Top of Sylvan shale was 4,625 feet, Viola lime 4,699 feet, Dense 4,733 feet, Dolomite 4,738 feet. Work was started the past week at three offsets. The new area has been named the Ramsey pool by the nomenclature committee of the Mid-Continent Oil and Gas Association.

Pure Oil Co. No. 1 Rogers, SE SE NE section 18-8n-12, wildcat in Hughes County, topped first Wilcox sand at 4,447 feet, second sand 4,494 feet, Arbuckle lime 4,998 feet and was bottomed at 5,054 feet. It was plugged back to 3,394 feet, drilled out to 3,600 feet, had a hole full of water and was abandoned.

H. F. Potts No. 1 Johnson, SW SW SE section 10-1s-2w, Carter County wildcat, was bottomed at 1,138 feet, plugged back to 803 feet, shot and acidized without result and was dry and abandoned.

Ralph North and others No. 1 Leibig, NE NW NW section 31-19-14, wildcat near Alsuma in Tulsa County, was shut down at 1,160 feet for casing.

Seminole County

Atlantic Refining Co. No. 2 South Riddle, NW SW NE section 2-10-5, North Earlsboro area, Seminole County, swabbed 291 bbls. of oil in 24 hours and was completed at 4,640 feet, total depth. Wilcox sand was topped at 4,630 feet.

Sinclair Prairie Oil Co. No. 1 Baker, NE SE SE section 29-10-8, topped Simpson Dolomite at 4,277 feet, total depth 4,288 feet, was acidized with 8,000 gallons and swabbed 365 bbls. of oil net and 60 bbls. of water in 24 hours.

Mid-Continent Petroleum Corp. No. 17 Fleet, NE SW SE section 7-5-8, an old well, was bottomed at 4,140 feet and pumped 10 bbls. of oil daily. It was shot and acidized and increased production to 40 bbls. daily.

D. Malarnee and others No. 1 Shelton, SE NW SW section 33-7-6, Dora pool, had Boggy sand at 2,840 feet, was bottomed at 2,916 feet, and swabbed 308 bbls. of oil in 24 hours.

Irvan Wilson and others No. 1 Wright, NE SW SE section 32-7-6, was dry and abandoned at 2,932 feet, total depth, in shale.

New work in Seminole County: I. T. Troup and others No. 1 Snyder, NW NE NW section 4-6-6, set 11-inch casing at 39 feet; Texas Co. No. 3 Reed, SE NE SE section 6-6-8, was a location; Malarnee & Shelton No. 4 Flowers, SW SW SE section 29-7-6, an old well, rigging up to deepen; Francis Oil & Gas Co. and others No. 1 Lewis, NE SE SE section 32-7-6, drilling at 520 feet; same company's No. 2 Lewis, SE cor. section 32-7-6, location; J. F. Smith No. 2 Austin, SE NE SE section 32-7-6, location; Malarnee & Shelton No. 3 Shelton, SW NW SW section 33-7-6, location; J. F. Smith No. 1 Harryman, NE SW SW section 33-7-6, an old well, moving in machine to deepen; same operator's No. 2 Harryman, spudded; same operator's No. 3 Harryman, spudded; Angle & Angle No. 1 Peabody, SW SW NW section 34-8-7, location.

Pontotoc County

Mid-Continent Petroleum Corp. No. 10 Statler, NW SE SW section 2-1n-7, Jesse pool, Pontotoc County, topped Bromide at 4,357 feet, first sand 4,430 feet, second sand 4,515 feet, total depth 4,520 feet in sand. It made potential of 1,290 bbls. of oil, with 1,800,000 feet of gas, and was completed.

Magnolia Petroleum Co. No. 37 Metropolitan Life, NW NE NE section 27-2n-7, Fitts area, was completed as a Cromwell sand well at 2,575 feet, total depth, and flowed 118 bbls. of oil through tubing in 24 hours.

Continental Oil Co. No. 1 Thompson, C S half NW SW section 35-2n-7, was bottomed at 4,562 feet, water intruded, it was plugged back to 3,796 feet and shot but was dry and abandoned.

First reports of new activity in Pontotoc County: Magnolia Petroleum Co. No. 1 Swift, NE SE SE section 3-1n-7, location; same company's No. 1 Augustanna, SW SW NE section 26-2n-7, building rig; same company's No. 38 Metropolitan Life, SW SE SE section 22-2n7, spudded; Lake Oil Co. No. 1 Grey, SE NW SW section 25-5-4, spudded; Westheimer & Neustadt No. 3 Factor, NW SE SW section 25-5-7, rig; Vierson Oil & Gas Co. No. 3 Factor, SW NE SW section 25-5-7, set 10¾-inch casing at 100 feet.

Pottawatomie County

Denver Producing & Refining Co. No. 1-A Gassway, SW cor. section 12-7-4, St. Louis district, Pottawatomie County, had a junked hole and was abandoned at 3,360 feet, total depth.

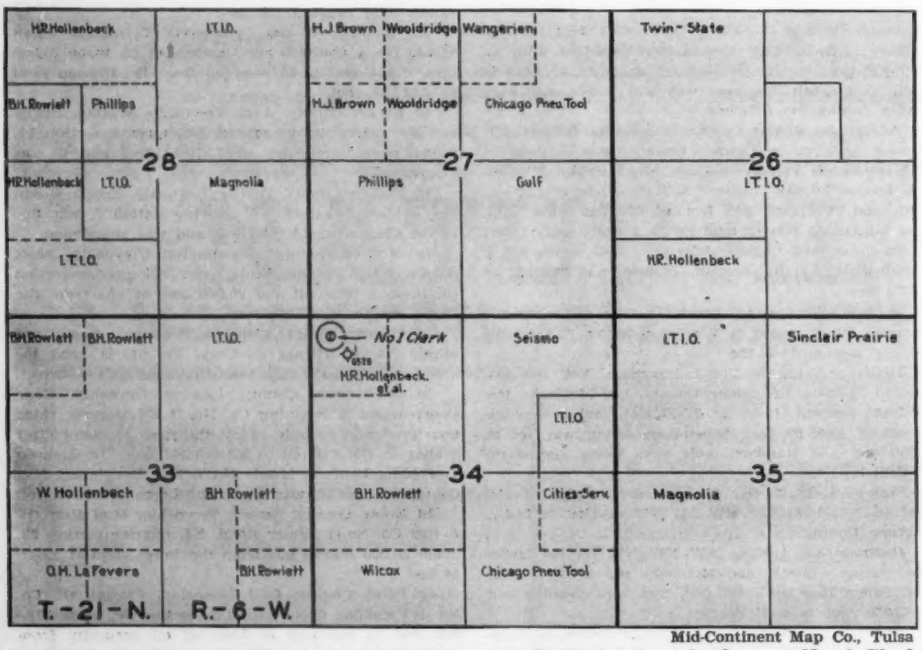
Same company's No. 1-A Hilton, SE SW NW section 23-7-4, had Calvin sand at 3,238 feet, water intruded and it was dry and abandoned at 3,270 feet, total depth.

Sinclair Prairie Oil Co. No. 4 Wolfe, SW NW NW section 29-7-5, an old well, was plugged back from old total depth of 4,166 feet to 4,141 feet, acidized and pumped 60 bbls. of oil net in 24 hours.

Gulf Oil Corp. No. 1 Benjamin A, SW SE NW section 13-7-4, was rigging up rotary at a new St. Louis pool test. Elbar Oil Corp. No. 1 Wyatt, NE NW NW section 10-7-4, an old well being deepened from 3,945 feet, was drilling at 4,080 feet.

Noble County

Phillips Petroleum Co. and Shell Petroleum Corp. No. 14 McCaughtry, SE SE NE section 21-23-2w, Bill-



Mid-Continent Map Co., Tulsa

The Garfield County wildcat being drilled by H. R. Hollenback and others at No. 1 Clark, section 34-21-6w, attracted attention as it drilled below 6,985 feet in Sylvan shale after missing Hunton lime

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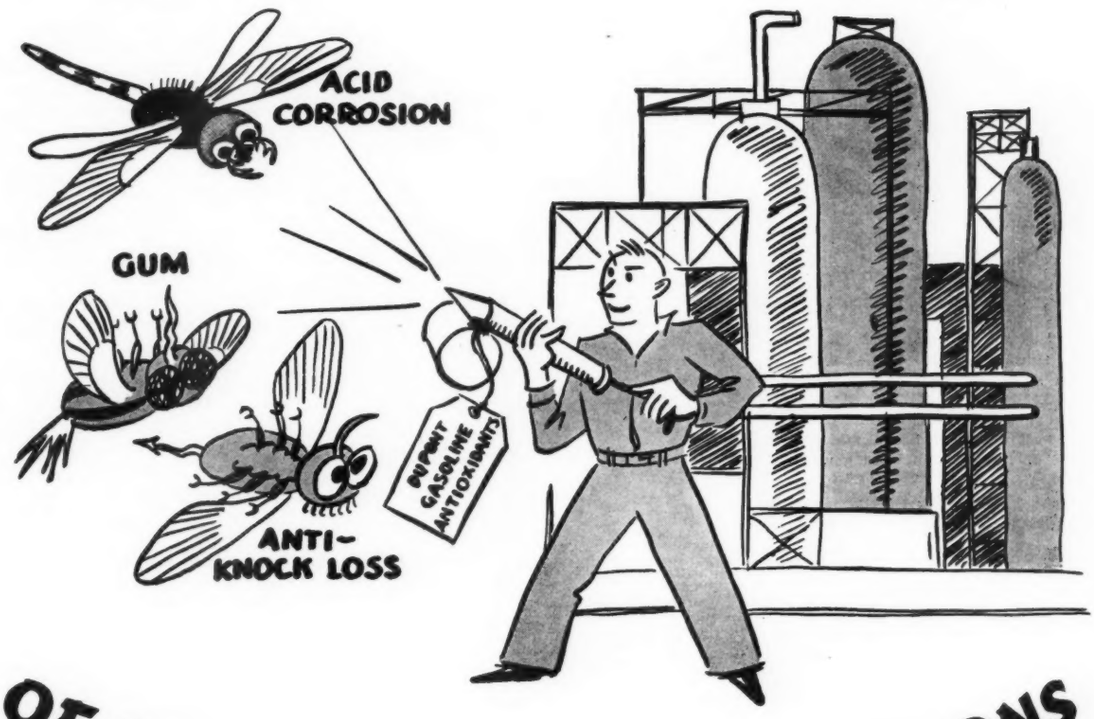

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GASOLINE ANTIOXIDANTS

ings pool, Noble County, was completed for potential of 3,290 bbls. of oil, with 2,450,000 feet of gas, from Wilcox sand topped at 4,280 feet, total depth 4,348 feet. It flowed 832 bbls. of oil in the first six hours.

Lincoln Petroleum Co. No. 4 O'Neill, NE NW SE section 16-23-2w, had Wilcox sand at 4,313 feet, total depth 4,335 feet, it was shot, water intruded and it was dry and abandoned.

Two new tests were reported in the Billings area. Phillips Petroleum Co. and Shell Petroleum Corp. No. 2 Brumfield, SW SW NW section 22-23-2w, was digging cellar. Continental Oil Co. No. 3 Conway A, SW NE SW section 16-23-2w, had cemented cellar.

Lincoln County

Two new producers were completed and an old oil well was deepened and recompleted in the Sac and Fox pool of eastern Lincoln County, which recently has experienced a revival of activity.

Wilcox Oil & Gas Co. No. 7 Sac and Fox, SE SE NW section 15-14-6, Sac and Fox pool, had Prue sand at 2,912 feet, was bottomed at 2,995 feet, and flowed 90 bbls. of 46-gravity oil daily through tubing.

Sinclair Prairie Oil Co. No. 2 Buckles, NE NW SE section 15-14-6, flowed 50 bbls. of 46-gravity oil in 24 hours from Prue sand topped at 2,919 feet, total depth 2,996 feet.

Same company's No. 1 Buckles, NW NW SE section 15-14-6, an old well, was deepened from 2,978 feet to 3,009 feet and flowed 18 bbls. of oil in 24 hours.

In the North Wellston pool, Stanolind Oil & Gas Co. and Amerada Petroleum Corp. No. 4 Arinwine, SW NE SE section 35-15-2e, topped Dolomite at 5,080 feet, Wilcox sand 5,110 feet, total depth 5,130 feet, flowed 464 bbls. of oil in 24 hours, was acidized and flowed 480 bbls. of oil net in 17 hours, making potential of 677 bbls. of 41-gravity oil. Gas gauged 1,500,000 feet.

Osage County

Indian Territory Illuminating Oil Co. No. 452 Osage, SE NE NW section 24-26-10, Osage County, produced 1,750,000 feet of gas and was completed at 1,887 feet, total depth.

Wolverine Oil Corp. No. 14 North Avant Unit, NW NW SW section 32-24-12, was completed as a repressure well at 1,658 feet, total depth.

Oklahoma Natural Gas Co. No. 1,940 Osage, NE NE SE section 18-20-12, was dry and abandoned at 1,540 feet, total depth.

Lewis Production Co. and Phillips Petroleum Co. No. 5 Osage NW SE NW section 9-24-7, was a location.

Pawnee County

E. S. Brewer No. 11 Cotton, NE SE SW section 6-20-8, Pawnee County, had Wilcox sand at 2,637 feet, was bottomed at 2,647 feet, and pumped 12½ bbls. of 38-gravity oil daily, completed.

Payne County

Ohio Oil Co. No. 2 Harris, SW NW NW section 19-18-5, an old Payne County well, was deepened from 2,110 feet to 2,173 feet, plugged back to 1,725 feet, ripped casing and produced 2,537,000 feet of gas.

Locations in the new Ramsey pool: Mid-Continent Petroleum Corp. and others No. 1 Wetzel, NE NE SE section 13-18-1e, diagonal southwest offset to the discovery; same operators' No. 1 Branton, SE SE NE section 13-18-1e, west offset to the discovery, and same operators' No. 1 Columbia, NW NW SW section 18-18-2e, south offset to the discovery, all locations.

Hughes County

X. X. McGee No. 5 Taylor, SW NW NW section 12-9-10, Hughes County, topped sand at 552 feet and had a hole full of water and was abandoned at 558 feet, total depth.

Marbett Oil Co. No. 2 Breeding, SE NW NE section 12-7-8, West Holdenville area, had dug cellar and pits. Power Oil Co. No. 2 Cox, SW NW NE section 21-9-9, was drilling at 260 feet.

Creek County

Alma Peru Oil Co. No. 2 McKee, NW SW NW section 7-17-8, Creek County, found Bartlesville sand at 2,970 feet, total depth 3,010 feet, and pumped 45 bbls. of 38-gravity oil in 24 hours.

Pure Oil Co. No. 7 Richards, NW NE SE section 4-17-7, an old well, was deepened from 2,592 feet to 2,718 feet, plugged back to 2,609 feet, drilled out to 2,620 feet and pumped 4 bbls. of oil in 1½ hours.

Schoolcraft and others No. 5 Fulkerson, C W half SE NW section 5-17-7, an old well, was deepened from 1,437 feet to Wilcox sand at 2,754-60 feet, total depth, and had a hole full of water. It was plugged back to 2,305 feet, acidized and pumped 10 bbls. of oil daily from lower Oswego and Prue formations.

Phillip Berry No. 1 Givin, NW NE NE section 22-17-10, had Mississippi lime at 2,500 feet, total depth 2,515 feet, and was dry and abandoned.

L. & L. Development Co. No. 2 Baker, SE NW NE section 14-17-10, found Red Fork sand at 1,916-40 feet, total depth 1,959 feet, plugged back to 1,940 feet and pumped 16 bbls. of oil daily.

J. E. Crosbie No. 7 Escoe, CNL NW SW section 26-18-8, an old well, swabbed 50 bbls. of oil daily after deepening from 1,326 feet to Red Fork sand at 2,592-2,610 feet, total depth 2,619 feet.

L. B. Jackson No. 9 Bear, NE SE SE section 35-18-8, found Red Fork sand at 2,626 feet, pay 2,630 feet, total depth 2,667 feet and pumped 5 bbls. of 36-gravity oil in 24 hours.

A. W. Swift & Co. No. 3 Hayden, NW SE SW section 12-19-9, had pay at 1,162-85 feet, was bottomed at 1,216 feet, and pumped 25 bbls. of oil daily.

Bruin Oil Co. No. 2 Morton, NE NW SE section 27-14-10, topped sand at 3,225 feet, had Sylvan shale at 3,235-80 feet, total depth, and flowed 106 bbls. of oil in 24 hours. Later, it flowed 45 bbls. of oil in 24 hours and was completed. Gravity of the oil was 37.2 degrees.

Sooner Oil & Gas Co. No. 2 Wilkerson, NW SE SE section 17-16-11, was drilling at 1,500 feet when first reported.

Estimated Daily Production

Estimated daily production of Oklahoma for the week ending January 15, and for the preceding week was as follows:

	Barrels	
	Jan. 15	Jan. 8
Allen	5,800	5,875
Billings	7,400	7,500
Burbank	7,725	7,850
South Burbank	13,225	13,750
Balance Osage	19,750	18,500
Blackwell district	5,300	5,225
Bristow-Slick	7,025	7,025
Chandler	2,475	2,500
Crescent	7,750	8,025
Cromwell	3,350	3,375
Cushing-Shamrock	10,600	10,750
Duncan disrtict	4,075	4,050
Edmond	8,900	9,200
Fish	4,300	4,425
Fitts	73,925	68,850
Jesse	3,900	3,525
Graham	4,250	4,275
Gray	1,225	1,200
Healdton	9,425	9,450
Hewitt	4,175	4,200
Holdenville	825	825
Keokuk	7,200	7,625
Konawa	1,550	1,525
Lucien	11,250	11,300
Moore	9,500	9,300
Oklahoma City	121,950	120,975
Olympic	6,725	6,950
Polo	775	750
Sasakwa and townsite	2,525	2,550
Sholem-Alechem	3,000	3,025
Seminole County:		
Bowlegs	10,350	10,525
Carr City	4,425	4,550
Earlsboro	5,625	6,025
South Earlsboro	650	625
East Earlsboro	6,450	6,400
Little River	9,125	9,225
East Little River	1,050	1,075
Maud	600	600
Mission	1,875	1,875
Seminole	8,525	8,650
East Seminole	1,925	1,775
Searight	3,850	3,850
Total Seminole	54,450	55,175
St. Louis-Pearson	18,800	18,625
Tatums	6,500	6,525
Tonkawa-Garber-Thomas	4,625	4,650
Wewoka	2,725	2,700
Yale-Jennings	3,750	3,875
Other pools	82,875	82,900
Total Oklahoma	543,600	538,825

Okmulgee County

M. P. Springer No. 1-A Hawkins, SW NW NE section 15-15-13, Okmulgee County, found Wilcox sand at 2,433 feet, had a hole full of water and was abandoned at 2,440 feet, total depth.

C. D. Klingensmith No. 18 Grayson, SE NE NW section 35-16-11, was a machine. Burke-Greis Oil Co. No. 1 Scott, SW SW NW section 20-10-10, an old well being deepened from 2,951 feet, was drilling below 3,380 feet.

Muskogee County

Armstrong and others No. 21 Morrison, C S half NW SW section 15-14-16, Boynton area, Muskogee County, topped Dutcher sand at 1,436 feet, total depth 1,490 feet, was shot and pumped 15 bbls. of oil in 24 hours, completed.

E. J. Metzger No. 1-A Simmons, CEL W half SE section 4-15-15, had a hole full of water in Wilcox sand at 1,691-98 feet, total depth, and was abandoned.

Carter County

Gulf Oil Corp. No. 1 C. R. Smith, C SW SW section 26-2s-3w, is the second deep well to be completed in the Fox field, Carter County. It flowed 854 bbls. of 69-gravity oil in 19 hours, with 24,000,000 feet of gas, and was completed for estimated potential of 1,079 bbls. of oil. Top of Hunton lime was 4,640 feet, Sylvan shale 5,127 feet, Viola lime 5,442 feet, Simpson formation 6,330 feet, oolitic lime 7,672 feet, total depth 7,773 feet.

New work in Carter County: Phillips Petroleum Co. No. 1 Tucker, SE NW SE section 5-1s-3w, moving in tools; Gulf Oil Corp. and Carter Oil Co. No. 1 Lester, C NW NW section 35-2s-3w, location; K. O. T. Oil Co. No. 7 Westheimer A, NE cor. section 35-4s-2w, an old well being deepened, drilling at 2,873 feet; George Orr and others No. 1-A Ward, SE cor. section 18-4s-2w, pits.

Caddo County

Magnolia Petroleum Co. No. 6 Sames, SE SE NE section 35-6-10w, Cement area, Caddo County, topped sand at 4,498 feet, was bottomed at 5,313 feet, plugged back to 4,549 feet and produced 34,000,000 feet of gas from Deese zone.

Three new operations in the Cement area were reported. W. L. Kistler No. 3 Hedlund, NW NE NE section 11-5-9w, was building rig. Willard L. Miller No. 2-A Garner, SW NW SW section 26-6-10w, was building rig. Same operator's No. 2-A Garner, SW NW SW section 26-6-10w, was building rig.

Stephens County

George L. Pace and others No. 16 Allen, SW SE NE section 3-2s-8w, Stephens County, had sand at 2,170-94 feet, total depth, and pumped 100 bbls. of 39-gravity oil daily.

Carl Carter No. 2 Warden-B, SE NE NW section 34-1s-5w, was completed as an 8-bbl. pumper in sand at 698-727 feet, total depth 729 feet.

Armor & Tomlinson No. 4 Nigh, SE NE NE SW section 11-2s-8w, had sand at 2,031-42 feet, total depth 2,085 feet, plugged back to 2,050 feet, was shot and pumped 2½ bbls. of 42-gravity oil daily.

Clark & Cowden No. 10 Simpson, NE SE NE section 11-1n-5w, was bottomed at 6,338 feet, plugged back to 4,140 feet, perforated casing at 4,064-83 feet, and produced 5,970,000 feet of gas from Deese formation.

Carl Carter No. 1-A Warden, NE SW NE section 34-1s-5w, was completed as a 1,000,000-foot gas well in sand at 904-08 feet, total depth.

Ed Parsons and others No. 1 Mouersburger, C S half SW SE section 29-2n-8w, wildcat, was a location. Carl Carter No. 3 Warden B, NE SE NE NW section 34-1s-5w, was a machine.

Jefferson County

Bridwell Oil Co. No. 15 Seay, NW NW NE section 10-7s-5w, southern Jefferson County, had sand at 1,088-1,105 feet, total depth, and pumped 15 bbls. of 31-gravity oil daily.

Same company's No. 16 Wahlgemuth, NE NE NW section 30-6s-5w, was completed as a repressure well at 1,521 feet, total depth.

Bridwell Oil Co. No. 5 Seay, NE NE SW section 30-6s-5w, was rigging up rotary tools.

Kay County

Neil Sullivan, trustee, No. 1-A Christenson, NW NW SE section 2-27-3e, Kay County, was dry and abandoned at 1,506 feet, total depth.

New Activity

In Logan County, Amerada Petroleum Corp. and Stanolind Oil & Gas Co. No. 2 Knight, NE SE SW section 12-17-1w, was building rig.

In Garfield County, Champlin Refining Co. No. 1-C Kindt, NW SW NE section 36-23-4w, was digging cellar and pits for a 5,000-foot gas test.

In Grady County, T. H. McCasland No. 1-A Mecklenburg, NE SE SE section 6-3n-5w, had dug pits.

Southwest Texas District

By F. L. SINGLETON

Deep Sand Discoveries in Saxet and Rio Grande Area

CORPUS CHRISTI, Tex., Jan. 17.—The discovery of a new sand in the northwest portion of the Saxet Heights field; a possible deep discovery in the Rio Grande Valley area and the testing of an outpost test one-half mile from the Ezzell field, McMullen County, were the highlights of an interesting week in the Southwest Texas district.

Deeper drilling in the Saxet Heights field, Nueces County, is expected as preparations were made by J. K. Culton to test No. 4 H. B. Baldwin after recovering several hundred feet of pipe line oil on a drill stem test. The test was made at 5,157-64 feet, showing 400 feet of 35-gravity oil and 250 pounds of working pressure in 4½ minutes. A 3-foot core was cut to 5,167 feet and 5-inch liner has been cemented on bottom. The producing zone is believed to be the Heterostegina formation.

No. 4 Baldwin is located 600 feet south of the discovery well in Block 20 of the J. C. Russel Farm Lots. It was originally completed through perforated casing at 4,080-90 feet. There is little possibility of the new sand being found over the entire field, as several deep tests drilled in this particular area failed to log the same zone. However, with production reported to be declining from the 4,000-foot zone, the new sand will be an incentive for deep drilling in various sections of the field.

Two more locations were staked in the recently opened West Saxet field, Nueces County. Rutherford Oil Corp. is building derrick on the L. A. Stewart 30-acre lease in the J. K. Dennan Survey, 3,500 feet southwest of the discovery well, while C. Andrade has staked location for No. 1 John Dunn, about 3,700 feet northwest of the discovery well. This gives the field four operations. The other two are being drilled by the Renwar Oil Corp. on the Charles McKenzie and Ran Morgan leases southwest and east of the discovery well.

In the same county and about 2,000 feet east of production in the Luby field, Seaboard Oil Corp. No. 9 James Luby, tested 650 feet of oil on a 10-minute drill stem test at 5,044-68 feet, and 7-inch casing is being cemented. The Railroad Commission granted the field an increase in daily allowable from 810 bbls. to 1,900 bbls., which will permit each producer a daily allowable of 100 bbls. per well. The increase was granted in order to supply foreign contracts.

In the western part of the county, in the Richard King field, Southern Mineral Corp. No. 4 King is flowing wash water and oil from perforated casing at 4,018-19 feet. The hole is bottomed at 4,226 feet with 7-inch casing cemented at 4,058 feet. It is located 2,342 feet northeast of No. 3 King in the Richard King Tract No. 6.

Important Wildcat Campaign

A wildcat drilling campaign of more than ordinary importance and which is expected to attract wide attention during the year, is getting under way along the submerged lands bordering the coast line adjacent to Nueces, Kleberg and Aransas counties. Official location for Pure Oil Co. and Superior Oil Co. joint test, No. 1 State Land, has been made and a canal is being dredged to the location. The well is located in the Laguna Madre Bay, Kleberg County, 440 feet from the north line and 440 feet from the east ine of Tract 168, lease No. 528. Lincoln Oil Co. has let contract to Trinity Drillers, Inc., of Corpus Christi, for No. 1 State located in Redfish Bay, about 4 miles southeast of Aransas Pass, while the Coastline Oil Co. has filed application for No. 1 State, which will be drilled in the same bay, about 2½ miles southeast of Aransas Pass.

The progress of Magnolia Petroleum Co. No. 1 Dietz, a wildcat located in the Gabriel Trevino Survey, Kleberg County, was being watched after sand with an odor of gas was cored from 5,603-07 feet. It is drilling ahead below 5,800 feet. The Oakville was topped at 5,110 feet, Heterostegina at 5,445 feet.

Another deep-seated structure was apparently opened in the Rio Grande Valley district with the completion of Atlantic Refining Co. No. 1 American Rio Grande, 3 miles southwest of Weslaco, eastern Hidalgo County. While the well continues to flow a large volume of wash water, it is reported to have made 11 bbls. of distillate on a 16-hour gauge through a one-half inch choke with tubing pressure 850 pounds. and casing pressure 1,050 pounds. The hole is bottomed at 9,180 feet, and it is producing through perforated casing at 8,995-9,005 feet. Production is believed to be from the Vicksburg formation.

Along the Jackson trend, a half-mile southwest extension to the Ezzell field, McMullen County, was indicated with the showing of Edwin M. Jones No. 1-E Ezzell, which has cemented casing for a production test after coring oil sand at 1,524-30 feet. The well is located in the southeast quarter of section 24. This field has proven to be one of the most important shallow structures in the district, having been extended several times during the year. Following the showing of the above test, location was made for No. 1-F Ezzell, about a half mile southwest of No. 1-E.

In the Balcones Fault Line district, interest was centered on Tuxedo Oil Co. No. 1 Graham, 7½ miles south of Buckholts, Charles Cronea Survey. The Pecan Gap was topped at 437 feet and soft lime with an oil show was cored at 440-44 feet and at 446-62 feet. Seven-inch casing was cemented at 439 feet for a production test.

Four miles southwest of Macdona, J. H. Pickens Survey, Bexar County, R. W. Fair No. 1 San Antonio Subdivision, logged the Anacache lime at 1,150-90 feet, with an oil show in the top section. Seven-inch casing was cemented at 1,140 feet and the operators are considering treating the formation with acid after the hole is bailed dry.

There were no outstanding developments in the Laredo district. C. K. Gravis and others No. 1 F. L. Fredrick which loomed as a possible discovery of a shallow field in northwestern Duval County, tested salt water in sand at 1,052-56 feet and the hole has been abandoned after it was deepened to 1,221 feet. Two other interesting wildcats in the county were abandoned. Magnolia Petroleum Co. No. 1 Duval County Ranch Co., G.B.&C.N.C. R.R. Survey No. 61, at 3,672 feet and James Hougan No. 1 Patton, Survey 148, at 5,002 feet.

COMPLETED WELLS IN SOUTHWEST TEXAS DISTRICT

Completed wells in the proven Southwest Texas fields, with their total depth, and the initial 24-hour production of the producing wells, were as follows:

Aransas County

McCampbell field: Atlantic Refining Co. No. 2-C Porterfield, 7,234 feet, 276 bbls., three-sixteenths inch choke. Atlantic-Harrison Abercrombie Oil Co. No. 3-D Porterfield, 8,013 feet, abandoned. Atlantic Refining Co. No. 3 Maryland Trust Co., 7,135 feet, 65 bbls., three-sixteenths inch choke. Atlantic Refining Co. No. 8-B Porterfield, 7,270 feet, 266 bbls., three-sixteenths inch choke. Atlantic Refining Co. No. 1-C Porterfield, 8,889 feet, plugged back 6,877 feet, perforated casing 6,862-66 feet, 126 bbls., 9/64-inch choke.

Caldwell County

Burdette Wells: Armstrong & Tinkle No. 1 Rodenberg, 2,244 feet, 85 bbls. of oil, 40 bbls. of water. Lost Mule field: McNeil Petroleum Co. No. 2 Moreno, 1,877 feet, abandoned. Salt Flat field: Spokane-Oklahoma Gas & Oil Co. No. 2 Davis, 2,564 feet, 60 bbls. flowing by heads.

Duval County

Benavides field: Navarro Oil Co. No. 1-A Rossi, 5,331 feet, 202 bbls. in 20 hours, quarter-inch choke. Colmena field: Colmena Oil Co. No. 8-B Duval County Ranch, 1,430 feet, 12 bbls., three-eighths inch choke. Hoffman field: Gulf Stream Oil Co. No. 8-B Hoffman, 2,784 feet, 35 bbls. jetting with gas. Seven Sisters field: Rudco Oil & Gas Co. No. 1 Ellis, 2,969 feet, abandoned. Piedra De Lumbree, oil sand 2,040-46 feet, 8 bbls. per hour, three-eighths inch choke.

Hidalgo County

Samfordyce field: Fohs Oil Co. No. 2 Guerra, 2,980 feet, abandoned.

Jim Hogg County

Darby Petroleum Co. No. 2-B Holbein, 1,828 feet, plugged back 1,823 feet, 99 bbls., one-half inch choke.

Goliad County

North Pettus field: Jane Oil Co. No. 7 Smith Grady, 3,765 feet, 40 bbls., swabbing eight hours.

Karnes County

Burnell field: Luling Oil & Gas Co. No. 16 Boyce, 3,659 feet, 115 bbls. in 18 hours, three-sixteenths inch choke.

McMullen County

Ezzell field: Harry Ezzell No. 2-A fee, 1,506 feet, 69 bbls., pumping. Harry Ezzell No. 11-A fee, 1,470 feet, 94 bbls., pumping. Harry Ezzell No. 10-A fee, 1,486 feet, perforated casing 1,452-62 feet, 61 bbls., pumping. Mike Glasscock No. 1 Franklin, 1,423 feet, 30 bbls., pumping. Parry & Delaney Oil Corp. No. 4 Hill, 1,494 feet, perforated casing 1,476-85 feet, 75 bbls. open tubing. Parry & Delaney No. 5 Hill, oil sand 1,464-67 feet, 86 bbls., three-eighths inch choke.

Nueces County

Flour Bluff field: Humble Oil & Refining Co. No. 4 Gulden, 6,665 feet, 176 bbls., one-eighth inch choke. Saxet field: Houston Oil Co. No. 13 McGregor, 6,920 feet, plugged back 6,725 feet, perforated casing 6,712-17 feet, 26 bbls. distillate, one-eighth inch choke. Maryland Corp. and Renwar Oil Co. No. 2-B Morgan, 7,031 feet, perforated casing 4,005-15 feet, gas well. Maryland Corp. and others No. 3 Stillwell-Sagarin, 5,785 feet, 30 bbls. distillate, quarter-inch choke. Stratton field: Camp Production Co. No. 3 Wardner, 6,417 feet, 90 bbls. distillate, quarter-inch choke.

Refugio County

Refugio field: M. F. Morgan No. 2-A Lambert, 6,339 feet, plugged back 6,140 feet, 120 bbls. of oil, 10 bbls. salt water, 9/64-inch choke. Houston Oil Co. No. 20 Rooke, 5,927 feet, 377 bbls., quarter-inch choke.

Webb County

Killam field: French Oil Corp. No. 9 Perez, 2,003 feet, 130 bbls., half-inch choke. O'Hern field: O. W. Killam No. 4 Bruni, 3,505 feet, abandoned. Oilton field: Kirkwood & Morgan No. 9 Juarez, oil sand 1,941-42 feet, 150 bbls. fluid, 50 per cent salt water. J. R. B. Moore No. 2 Martin, oil sand 1,870-82 feet, 160 bbls., pumping. Mountain Town Site Oil Co. No. 1 fee, oil sand 1,914-20 feet, 150 bbls. pumping.

Victoria-Calhoun Counties

Heyser field: Gulf Oil Corp. No. 1 Bonner, 5,500 feet, perforated casing 5,487-92, 5,485-87 feet, 319 bbls., 9/64-inch choke.

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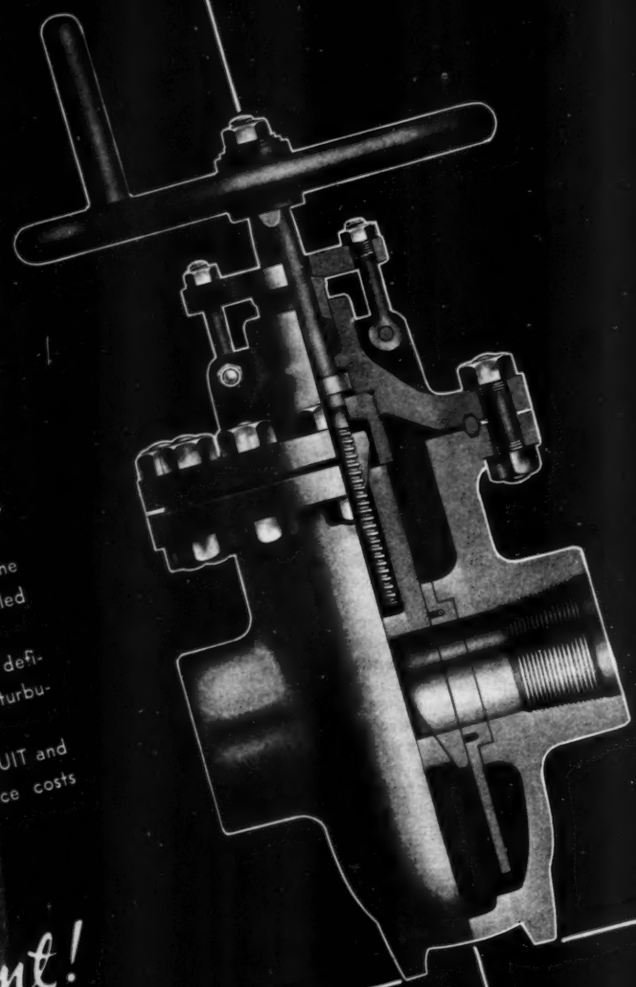

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North and East Texas

By MITCHELL TUCKER

Add 10 Producers to K.M.A.; Open a Pool in Jack County

WICHITA FALLS, Tex., Jan. 17.—The continually expanding K.M.A. field of southern Wichita County, Texas, last week reported its greatest number of weekly deep well completions since activity began several years ago. Ten wells were completed having an aggregate potential of 11,211 bbls. per day. As the week closed there were 62 locations or wells rigging up and 54 wells drilling. Of this number of drilling wells, 20 were in the process of completion.

In addition to the several major companies already operating in the field the Shell Petroleum Corp. entered the activity through the purchase of 80.2 acres from H. D. Eggers of Dallas in the west half of the southeast quarter of section 20, Block 7, H.&T.C. Survey, D. R. Preston land, 2 miles west of production, for $40,000, of which half was cash and half to be out of oil produced.

Important developments at the numerous outpost wells featured the drilling activity last week. A possible 2-mile extension to the northwest was seen in Joe A. Worsham No. 1 Waggoner Brothers, SE cor. section 13, B.S.&F. Survey, Abstract No. 394. This test is about 2 miles northwest of the King Oil Co. No. 1 Waggoner Brothers. Operators cored 40 feet from 3,748 feet to 3,788 feet and recovered 20 feet of core, the bottom 3 feet being fine, hard saturated sand. The well was then cored from 3,788 feet to 3,808 feet, total depth, with a recovery of 2½ feet showing dense gray lime. Pipe will be set for production test, and if a producing well is not obtained, it was reported the test may be carried to the Ellenburger of the Lower Ordovician, expected around 5,000 feet.

Extending sand production a mile west of the Hammon and Hanlon-Buchanan, Inc., No. 1 Fassett & Tuttle, producer on the north side of the field, Manson Oil Co. No. 1 T. F. Mitchell was cleaning out after flowing over the derrick following an 80-quart shot in the pay from 3,920 feet to 3,944 feet. Location is in the Colonel Tap Survey, Block 10, Abstract No. 51.

Geier Brothers & Jackson were reported to have started drilling plug in their No. 1 Ancell, Montgomery Survey, Abstract 795. The well is 3½ miles southwest of production on the west side of the pool and was reported to have found hard, saturated lime and sand from 3,962 feet to 3,977 feet. Total depth is 3,977 feet, with casing cemented at 3,958 feet.

Jack County

A pool 7 miles north of Jacksboro was opened last week as Hanlon-Buchanan, Inc., No. 1 E. M. Meyers, F. Rodnose Survey, started flowing by heads as operators were cleaning out following a small shot with nitroglycerin. The pay was topped at 2,706 feet and 14 feet of penetration was taken. According to operators, the well will be deepened several more feet.

Clay County

About 3½ miles southwest of the shallow Petrolia oil and gas field, Clay County, the Wood Petroleum & Royalty Corp. of Oklahoma City has let a contract for a 5,000-foot test to be started immediately on the I. H. Kempner lands. The block of leases on which this deep test will be made is located about 4 miles west of Wirt Franklin's proposed deep test on the Body Land, which will also be started immediately.

EAST CENTRAL TEXAS

DALLAS, Tex., Jan. 17.—Three new wildcat locations were staked in East Central Texas during the past week. The Lone Star Gas Co. of Dallas announced location for a 6,000-foot test in the Buffalo gas area of central Leon County on acreage acquired several months ago in a deal with Shell Petroleum Corp. which gave the gas firm around 8,000 acres and three gas producers in the field. The test will be No. 1 Sarah Melasky, W. C. Lee Survey, Abstract 500.

Location for Kilgore No. 1 J. M. Marrs has been staked in the J. S. Rutland Survey, 2 miles south of the Bosque field of McLennan County.

King Oil Corp. was moving in materials for a second wildcat in Bowie County, the No. 1 Monroe Watts, in the J. A. Talbot Survey, 4 miles northwest of Texarkana. The test will be about a mile south of the same operator's No. 1 W. W. Ames, now drilling at 3,200 feet.

Anderson County

H. L. Parsons and associates No. 1 Hemby in the John Gossett Survey, Woodbine sand wildcat test about 5 miles southwest of Elkhart in southern Anderson County, set 5½-inch casing on bottom at a total depth of 5,486 feet. After the cement plug is drilled, the well is expected to be deepened in an attempt to establish a water table depth. The wildcat is showing for a gas well in the upper Woodbine sand at 5,360 feet with an estimated flow of 10,000,000 feet. The gas showing is not as large as that encountered in either the Grapeland of Percilla Woodbine structures in northern Houston County.

Talco Field

Attention in the Talco pool of Titus and Franklin counties was centered on edge tests in the northern part of the field. At the close of the seven-day period there were five wells rigging up, eight drilling and six completions with an initial production of 1,657 bbls. Four of these completed wells were along the northern flank of the pool structure.

Opelika Test Shows Increase

At Opelika in Henderson County, Seaboard-Tide Water-Humble No. 2 McElreath & Suggett, gas-distillate producer, now on a 30-day flowing test, has increased its production from 137 bbls. of distillate and 5,340,000 feet of gas to 317 bbls. of distillate and 9,890,000 feet of gas. Gravity now reads 58.4 against 57.4 last week. Pressures are now gauging 2,650 pounds on casing and 1,950 pounds on tubing.

Mexia Deep Test

In the Mexia field, Limestone County, Pure Oil Co. No. 16-T Kendrick has completed its fishing job and is testing the upper sands. The casing was perforated with 28 shots from 5,580 feet to 5,630 feet, and after running the swab, only brackish water was recovered. Operators now plan to again perforate the casing at 5,515-50 feet and test a higher sand.

Kelsey Dome

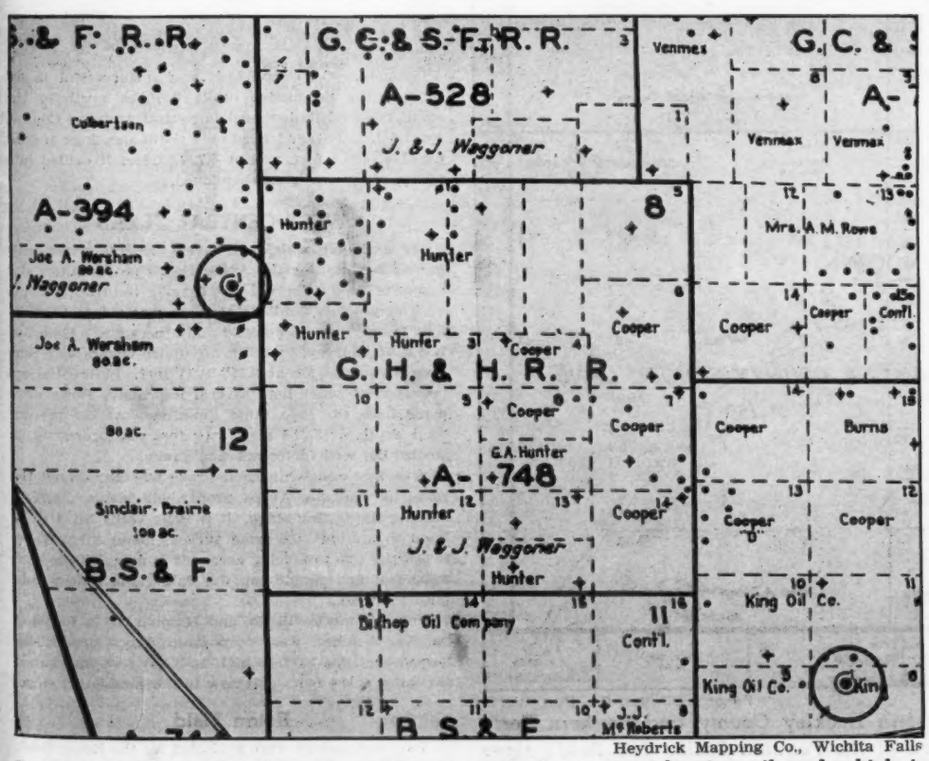
Tom Hunter and American Liberty Oil Co. No. 1 Carter, deep test on the Kelsey dome of Upshur County, is drilling ahead in shale and lime streaks at 5,485 feet. In the course of drilling, Red Beds were topped at 5,085 feet and the Glen Rose at 5,345 feet.

NORTH TEXAS COMPLETIONS

Wichita County (K.M.A. Field)

Blackwell Oil & Gas Co. No. 1 Hodges, 3,644-3,792 feet, 264 bbls. per day. W. H. Bohner No. 1-A First National, 3,620-3,480 feet, 900 bbls. per day. Cato Brothers No. 2 J. A. Kemp Estate, 3,640-3,796 feet, 1,172 bbls. per day. Kadane-Griffith Oil Co. No. 1 Kemp

(Continued on Page 135)



Heydrick Mapping Co., Wichita Falls

Location of Joe A. Worsham No. 1 Waggoner Brothers, now showing oil and which is expected to make a 2-mile northwest extension from King Oil Co. No. 1 Waggoner in the M. A. Willis Survey, K.M.A. field in Wichita County

West, Central and Panhandle Texas

Ordovician Tests Centers of Interest in the Basin District

By MITCHELL TUCKER

FORT WORTH, Tex., Jan. 17.—Forty-six locations were made in the Permian Basin area of western Texas last week, while 55 completions were recorded. A total of 319 drilling wells were reported in the territory. Of the 55 completions made, seven were dry holes on wildcat blocks.

Ordovician Search

Principal interest in the West Texas Basin territory continues to center around the several important deep tests of Ordovician possibilities.

Stanley A. Thompson of Fort Worth greatly stimulated this interest when his No. 1 Elsinore Cattle Co. wildcat in south central Pecos County, G.C.&S.F. Survey, found attractive showings of gas and oil in an unconformable zone between the Pennsylvanian and the Ellenburger. The saturated zones extended from 7,041 to 7,098 feet, and as the week closed drilling was progressing at 7,128 feet without having found what is thought to be the true Ordovician beds. Operators plan to make a Schlumberger electrical survey of the open hole early next week, and drill stem tests will be made if they appear justified.

Magnolia Petroleum Co. No. 1-A McKee seems assured of opening a new Ordovician producing area in northern Pecos County near Imperial in the H.&G.N. Survey. Oil saturation has been cored in the Simpson sand at 5,271-80 feet, and 9⅝-inch casing was cemented at 5,192 feet. Production tests will be made of the open hole from 5,192 feet to total depth of 5,294 feet before drilling continues.

Gulf Oil Corp. No. 3 McKnight, western Crane County test about 3 miles northeast of the Sand Hills field, where prolific Ordovician production has been found, is now coring dense Dolomite at 6,215 feet in the Ellenburger. No porosity or saturation has been logged as yet.

Brewster County's bid for production in the lower formations, Floyd C. Dodson No. 1-A Texas-American Syndicate in the Big Bend region near the Hovey dome, has topped the Simpson, middle Ordovician, at 6,733 feet, which on subsea correlations places it several hundred feet higher than the Sand Hills production of Crane County from the same level. The Dodson well is about 70 miles southwest of Sand Hills.

H. F. Wilcox No. 1 McKnight, northwest Crane County wildcat in the G.M.M.B.&A. Survey, has been abandoned at a total depth of 7,221 feet without finding the Ordovician, its objective.

Humble Oil & Refining Co. No. 1 Lewis and Wardlaw, scheduled Ordovician test in western Tom Green County, is drilling ahead below 3,850 feet, after clearing up a prolonged fishing job at 3,811 feet.

Loving County

Additional favorable reports from the Mason field of Loving County, where Delaware sand production was opened, continued throughout the week. Barnett Petroleum Corp. No. 1-A Johnson, situated about 2½ miles northwest of the Mason pool, found a saturated zone in the Delaware about 140 feet deeper than found at Mason, and oil rose to the top of the hole after penetrating the oil sand from 3,844 to 3,846 feet. Continued production tests by swabbing brought showings of sulfur water, and the well's outcome was uncertain as the week closed.

Ector County

The Harper field in central Ector County, about 6 miles west of Odessa, continues to demonstrate its potentialities as a major producing area. Broderick & Calvert No. 1 Parker, within the recent 2-mile northwest extension given the field, flowed 900 bbls. of oil the first 17 hours on Railroad Commission gauge. Aggregate initial production for the past week's seven completions in this field was 4,200 bbls. daily.

Cochran County

The Duggan field of Cochran County, recent discovery in the northern part of the basin, seems assured of its second producer as Ingleright & Fogelson No. 2 Duggan, Oldham County School land, about one-half mile southwest of the discovery well, topped Permian lime at a favorable depth and cored saturation and porous lime from 4,996 to 5,073 feet, its present depth. Bailing tests are now being made.

New Wildcats

The promising Slaughter field of Hockley County received two semi-wildcat outpost tests last week, both by the Honolulu Oil Co. on the Zavalla County School Lands.

Wildcat Abandonments

Harris-Anderson Corp. No. 1 Mrs. Mollie Robinson estate, T.&P. Survey, in southeastern Martin County, found sulfur water in the Permian and has been abandoned at a total depth of 4,189 feet.

In Borden County, Continental Oil Co. No. 1-A Clayton, T.&P. Survey, was abandoned as dry at a depth of 3,838 feet.

Honolulu Oil Corp., Ltd., was unsuccessful in extending the productive limits 2 miles north of the small two-well Parker pool in central Andrews County. No. 1-6 J. E. Parker logged only slight showings of dead oil at 4,710-15 feet, and at 4,738-45 feet it drilled into sulfur water, and was abandoned.

WEST CENTRAL TEXAS

Several wells which will have a very important bearing on determining the Avoca field's potentialities and extent of production are fast nearing the testing stage.

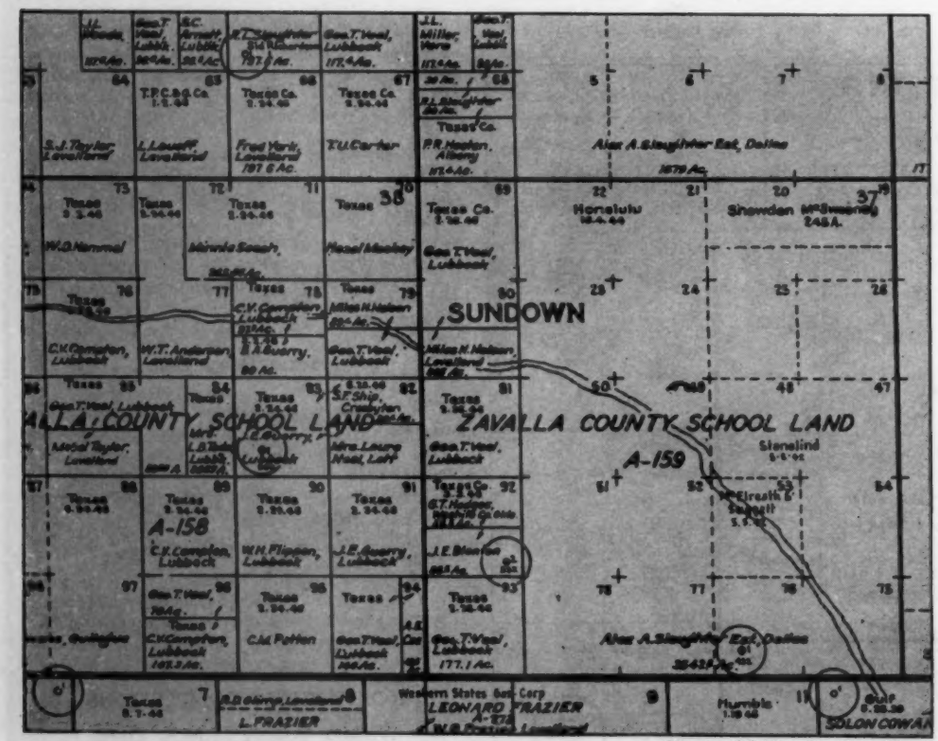
The possible 5-mile extension across into Shackleford County, Owens-Snebold and others No. 1 Haterius, B.B.B.&C. Survey, has shut off upper waters by a successful squeeze job at 3,192-3,211 feet. Before the appearance of water here several impressive flows were made from the Palo Pinto limestone. At the present total depth of 3,218 feet, operators are preparing to acidize the well for completion gauge.

The key well which will prove whether or not the Haterius well and Avoca proper will connect, is fast nearing the testing stage. It is Bells Wells No. 1 R. L. Pond in section 165, same survey, about midway between the two producing areas. It is now drilling near 2,650 feet and should top the Palo Pinto lime within the next week.

Iron Mountain Oil Co. and Humble Oil & Refining Co. No. 3 Jones, west outpost to Avoca production, topped the lime 31 feet high at 3,180 feet, and bailed free oil at 3,184 feet. It is now in the completion stage.

Rotan Field

Two completions were indicated for the Rotan field. On the north end of the field, Tide Water Associated Oil Co. No. 3 E. L. Smith, cored into the Noodle Creek lime and set 7-inch casing at 3,540 feet. A southwest outpost, the Montour Production Co. No. 2 E. L. Smith.



Zingery Oil Map Co., Fort Worth

The Slaughter field development in southwestern Hockley County and northern Terry County, in the northernmost producing section of the Permian Basin. The field's three producers are seen extending in a northwest direction. To the west, north and east are outpost tests staked after the completion of the field's third and best producer by the Texas Co.

is coring the pay section at 3,530 feet, with favorable porosity and saturation reported.

Lewis Field

Three new locations were made in the Lewis field of Jones County, two of which were offsets to the new southeast extension given the pool by Smith & Fields No. 1 C. L. Carter, which is showing for a 200-bbl. producer after a shot in the upper Bluff Creek sand at 1,875-85 feet. A diagonal northwest offset was made by Fain-McGaha and S. B. Roberts of Wichita Falls. To the west, J. S. Bridwell made location for his No. 1 C. L. Carter. Danciger Oil & Refineries is also preparing to drill its No. 1 Hugh E. Roberts in the SW cor. of the east 110 acres in section 37-15, T.&P. Survey.

TEXAS PANHANDLE

In the extreme northern part of the Texas Panhandle, the I.T.I.O. company's wildcat in Sherman County, near Stratford, is creating a great deal of excitement. The well is now shut down at a total depth of 2,719 feet and making about 2,500,000 feet of sweet gas. The well will be deepened. Although the new gas-producing area is many miles north of the gas production in Moore County, it is checking considerably higher structurally. The I.T.I.O. company holds a block of about 16,000 acres surrounding this well.

The week's completions in the West Texas, Central Texas and Panhandle districts, with the sand record or total depth, and initial 24-hour production of the oil and gas wells are given below:

WEST TEXAS COMPLETIONS

Andrews County

Two wildcats, Honolulu Oil Co. No. 1-6 Parker and Continental Oil Co. No. 1-A Clayton-Johnson, were dry and abandoned at respective depths of 4,806 feet and 3,538 feet.

Crane County

Two wildcats, Wilcox No. 1 McKnight and C. E. Litchfield No. 1 W. A. Harris, were dry and abandoned at respective depths of 7,221 feet and 2,001 feet.

In the Waddell field, Gulf Oil Corp. No. 20 Waddell, 3,225-3,518 feet, 9,648 bbls. per day.

Ector County

In the Connell field, Texas Co. No. 20 Connell, 3,434-3,630 feet, 587 bbls.

In the Foster field, Mid-Continent No. 1 Griffin, 4,175-4,457 feet, 35 bbls. Arkansas Oil Co. No. 1 Johnson, 4,130-4,237 feet, 496 bbls. Stanolind Oil & Gas Co. No. 7-B E. F. Cowden, 3,985-4,167 feet, 1,580 bbls. Sinclair Prairie No. 3 Johnson, 4,153-4,260 feet, 386 bbls. Atlantic No. 3-A Johnson, 4,090-4,250 feet, 909 bbls.

In the Goldsmith field, Dunning No. 3-A Cummins, 4,210-4,290 feet, 304 bbls. Gulf Oil Corp. No. 59 Goldsmith, 4,168-4,250 feet, 924 bbls. Gulf Oil Corp. No. 60 Goldsmith, 4,115-4,215 feet, 2,872 bbls. Magnolia Petroleum Co. No. 2 Slater, 4,206-82 feet, 1,081 bbls. Gulf Oil Corp. No. 62 Goldsmith, 4,133-4,205 feet, 2,220 bbls. Shell Petroleum Corp. No. 2 Slater, 4,210-85 feet, 461 bbls.

In the Harper field, Oil Well Drilling Co. No. 1-B E. Cowden, 4,080-4,235 feet, 625 bbls. Shell Petroleum Corp. No. 4 Cowden, 4,090-4,301 feet, 419 bbls. Superior Oil Co. No. 2 E. F. Cowden, 4,160-4,285 feet, 1,162 bbls. Sinclair Prairie No. 3 Wight, 4,125-4,220 feet, 784 bbls. Mid-Continent Petroleum Corp. No. 1 Slater, 4,237-73 feet, 660 bbls. Landreth No. 1-J Scharbauer, 4,140-4,200 feet, 342 bbls. Borsodi, Beatty & Bowles No. 2 TXL, 4,222-86 feet, 111 bbls.

Fisher County

In the Rotan field, Dean Brothers No. 1 Young, dry and abandoned at 3,110 feet.

Howard County

In the Chalk-Roberts-Settles area, F. W. Merrick and others No. 1 Roberts, 3,011-47 feet, 33 bbls. Merrick-Bristow No. 4 Roberts, 2,970-72 feet, 1,091 bbls. Royal Oil & Gas and Cosden Oil & Refining Co. No. 17 Roberts, 2,536-94 feet, 1,248 bbls.

In the Denman field, Sinclair No. 5 Percy Jones, dry and abandoned at 3,085 feet. Shasta No. 1-B Texas Land Mtg., 2,708-2,850 feet, 1,483 bbls.

In the Harding field, W. E. Production Co. No. 3 Wilcox, 3,120-3,340 feet, 20 bbls.

Jones County

In the Hawley field, Sinclair Prairie No. 13 B King B, 2,150-60 feet, 291 bbls.

In the Lewis field, Fain-McGaha Oil Corp. No. 1 Mrs. L. E. Williams, 1,925-56 feet, 500 bbls.

A wildcat, E. P. Campbell No. 1 L. G. Lee, was dry and abandoned at 2,448 feet.

Martin County

A wildcat, Harris-Anderson Oil Corp. No. 1 M. Robinson, was dry and abandoned at 4,189 feet.

Pecos County

In the Taylor-Link field, Lee Petroleum Co. No. 18 University, 1,694-1,725 feet, 503 bbls.

In the Yates field, Ohio Oil Co. No. 58-A Yates, 1,525-90 feet, 1,040 bbls.

Upton County

In the McCamey field, Peerless No. 3 Shirly, 2,110-2,213 feet, 618 bbls. Cardinal Oil Co. No. 9 Wooley, 2,132-80 feet, 171 bbls.

Ward County

In the Grand Falls field, Province & O'Quinn No. 3 Hadwin, 2,155-2,242 feet, 20 bbls.

In the Hathaway area, Humble Oil & Refining Co. No. 26 Richter, 2,750-2,930 feet, 876 bbls. Gulf Oil Corp. No. 71 Estes, 2,503-2,679 feet, 1,237 bbls.

In the Hutchins field, Gulf Oil Corp. No. 92 Hutchins, 2,524-2,765 feet, 871 bbls.

In the O'Brien field, Gulf Oil Corp. No. 89 O'Brien, 2,549-2,766 feet, 191 bbls.

Winkler County

In the Henderson field, Humble Oil & Refining Co. No. 19-C J. B. Walton, 2,900-3,015 feet, 1,347 bbls.

In the Kermit field, Humble Oil & Refining Co. No. 26-C Colby, 2,775-3,070 feet, 253 bbls. Magnolia Petroleum Co. No. 123 Walton, 2,835-2,933 feet, 979 bbls.

In the Keystone field, Richardson No. 4-B Humble-Walton, abandoned location. Richardson No. 5 Humble-Walton, abandoned location. Texas Co. No. 1 Seth Campbell, 3,085-3,282 feet, 40 bbls. Richardson No. 8-B Humble-Walton, 3,300-3,405 feet, 209 bbls. Continental Oil Co. No. 3 J. B. Walton, 3,296-3,398 feet, 90 bbls.

In the Scarborough field, Cities Service Oil Co. No. 5 Scarborough, 2,902-3,052 feet, 389 bbls.

Yoakum County

In the Wasson field, Toddie L. Wynne No. 1 H. W. Willard, 4,945-5,000 feet, 294 bbls.

WEST CENTRAL TEXAS COMPLETIONS

Jones County

Felmont Corp. and Allen, wildcat test, abandoned at 3,402 feet. Humble Oil & Refining Co. No. 2 Hollums, Avoca field, 3,213-24 feet, 1,316 bbls. W. L. Herring No. 1 Dr. J. G. Dodge, dry and abandoned, total depth 2,455 feet.

Taylor County

Wichita Production Co. No. 1 E. Lincecum, dry and abandoned, total depth 2,155 feet.

Callahan County

Woodley Petroleum Co. No. 1 Jack M. Flores, 4,323-33 feet, 50 bbls.

PANHANDLE COMPLETIONS

Carson County

Gulf Oil Corp. No. 22 Cooper, 2,968-3,047 feet, 412 bbls. Panhandle Eastern Pipe Line Co. No. 1-16 Sanford, 2,610-2,914 feet, 32,396,000 feet gas. Texas Co. No. 9 Boney, 3,065-3,150 feet, 536 bbls.

Gray County

Danciger Oil & Refining Co. No. 6 Bynum, 3,199-3,208 feet, 152 bbls. Drilling & Exploration Co. No. 8 Leopold, 3,280-98 feet, 530 bbls. Kewanee Oil & Gas Co. No. 14 Morgan, 3,180-3,214 feet, 724 bbls. Continental Oil Co. No. 1 Short, 3,153-3,280 feet, 192 bbls. R. B. Pringle No. 9 North Volmert, 3,215-85 feet, 367 bbls. Magnolia Petroleum Co. No. 19 fee, 2,880-2,945 feet, 358 bbls. Sinclair Prairie No. 4 Harrah, 3,160-3,251 feet, 193 bbls. Texas Co. No. 5 Brown, 3,200-75 feet, 321 bbls.

Hutchinson County

Continental Oil Co. No. 5 Johnson C, 3,035-50 feet, 787 bbls. Smith Brothers No. 2 Hugh Umphres, 3,123-45 feet, 543 bbls. Stanolind Oil & Gas Co. No. 11 Haile A, 3,030-3,102 feet, 466 bbls. Phillips Petroleum Co. No. 29 Cockrell Ranch, 2,968-3,037 feet, 315 bbls.

Moore County

Magnolia Petroleum Co. No. 5 Jones, 3,021-70 feet, 656 bbls. Panhandle Eastern Pipe Line Co. No. 1-25 Thompson, 2,920-3,355 feet, 34,689,000 feet gas. Shamrock Oil & Gas Co. No. 11 Sneed, 2,900-3,008 feet, 19,412,000 feet gas.

Wheeler County

Hal Vaughn No. 1 Kro, 1,890-2,005 feet, 18,247,000 feet gas; No. 1 Macina, 1,895-2,005 feet, 19,700,000 feet gas; No. 1 K. Pakan, 1,920-93 feet, 28,900,000 feet gas; No. 2 K. Pakan, 1,950-2,065 feet, 26,000,000 feet gas; No. 3 K. Pakan, 1,910-2,065 feet, 11,300,000 feet gas; No. 1 Valencik, 2,150-2,225 feet, 20,800,000 feet gas.

Dr. J. Bryan Eby, geologist and independent oil operator of Houston, Tex., who recently returned from a trip in the East, was the principal speaker at the regular meeting of the Houston Geological Society last week. He discussed the "Relation of Petroleum Exploration and Discovery to Reserves."

PETROLEUM PRODUCERS CO.

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WICHITA FALLS, TEXAS

Michigan Field Report

By
O. C. PRESSPRICH

Price Cuts Affect Work in Fields; Delay Completions

SAGINAW, Mich., Jan. 17.—Low prices for Michigan crude due to recent reductions reflected a trend the past week, which will result in few wells being brought into production until markets for Michigan oil become better stabilized.

The curtailed production was noticeable the previous week, and more so this past week, when only five wells were brought into production in Buckeye's prolific field. Operators are reported to be holding back bringing their wells into pay sands, feeling that it is poor business to pour more crude on the market at present prices.

Wildcatting is continuing in many sectors, but even these wary operators, facing potential losses on anticipated returns, are reported holding back their drilling schedules. Such a situation is certain to have a retarding effect on development, operators agree. Winter conditions usually retard drilling and production, but price cuts on crude are now cited as the principal cause for slackened development in the Michigan fields.

North Buckeye

Two large natural producers materially increased the output in section 12, northeast part of the Buckeye field, the past week. Topping the list of three additions to the north field was Cryden & Rowmor No. 7 Shaffer, NE SE SW section 12-18n-1w, which gauged a production of 900 bbls. natural production daily. The well is an interior location in a proved area, but gave an initial higher than nearby producers. American Drilling Co. No. 5 Soldan, NE NW SE section 12-18n-1w, gauged a 500-bbl. daily natural production to become the second ranking well of the week. C. W. Teater No. 3 Domokos, SW NW NW section 11-18n-1w, was the third north pool producer of the week, and developed 250 bbls. daily after acid. Both sections 11 and 12 are practically completed as to drilling locations with only a few sites remaining to be brought into active production, and with no hint of a dry hole.

South Buckeye

Doldrums struck the south Buckeye field also last week, with only two wells reaching production depths. Jacob Beck No. 2 Buehler, NW SW SW section 24-18n-1w, ranked as the most important strike of the week. The well gauged a 125-bbl. natural production in a semiproved area lying to the east of section 23—midway pool discovery sector—which united practically overnight with the south field. The Kales-Graves Co. No. 3 Wooding, SE SE SE section 23, a midway field test, reported a hole full of oil, and plans being made for acid treatment. No producers were brought in last week in the south pool proper, although several were reported near pay levels.

Isabella County—Broomfield Township

Pure Oil Co. No. 10 Willie, NE NE NW section 4-14n-6w, widely reported as a "gusher" two weeks ago but which turned immediately to water, faced the ignominous fate of becoming a brine depository as operators planned to use this hole to dispose of brine from nearby wells.

Isabella County—Sherman Township

Pure Oil Co. No. 2 Latham Heirs, SE SE SE section 32-15w-6w, reported production of 140 bbls. daily natural, and was preparing to treat with acid. The same company's No. 4 Embrey, SW SW SW section 34, was tubing to treat after an initial gauge of 325 bbls. daily.

Midland County—Edenville Township

Nitroglycerine to probe the lower regions in hope of stirring up an oil flow was the next test planned for Sun Oil Co. No. 1-B State, C N half SE NE section 5-16n-1w. The well was plugged back last week preparatory to the shot.

Midland County—Larkin Township

Daily Crude Oil Co. No. 1 State, NE SE SE section 29-15n-2e, is to be plugged and abandoned after failing to find a show of oil.

Bay County

Three Bay County wells were at various stages of completion last week in three different townships. In Garfield Township, 16n-3e, Charles Weller No. 1 Dewyer, NW NW SW section 20, has reached the final casing point. In Monitor Township, 14n-4e, Gulf Refining Co. No. 1 Marston, SE SW NE section 1, was reported plugging back for treatment. In Mount Forest Township, 17n-3e, Stork Oil Co. No. 1 Century, NE SE SE section 9, was reported as completing and due to hit pay level any day.

Arenac County—Adams Township

After hitting a good show of oil in the Traverse, E. Harvey Linabury No. 2 McTaggart, NE NE SE section 26-19n-3e, planned an acid test to increase the flow.

Isabella County—Nottawa Township

The second failure in the Nottawa Township field, which a few weeks ago loomed as a possible new pool, was recorded last week when Cryden & Rowmor No. 1 Smith, SW SE NE section 35-15n-5w, hit Dundee water at 3,272 feet. The Nottawa field is 5 miles southwest of Mount Pleasant. Structures were reported high. Boston Oil & Gas Co. No. 1 Fox, NE NE NE section 23-15n-5w, 2 miles to the north, opened with small shows last fall, and was considered the opener of a possible new field until it failed.

Wildcats Invade Kalamazoo

Kalamazoo County, in the southwestern corner of Michigan, will get its first oil tests soon as wildcatting operations spread southeastward from the Salem field of Allegan County across the border into Kalamazoo County.

This was revealed the past week when the state conservation department's drilling permit listing showed licenses issued to Premier Oil Corp. for two locations in Oshtemo Township (2s-12w).

For the first time since its first well was brought in in July, 1936, the great Buckeye oil field of Gladwin County stepped out in December to show—even under proration—more than half of the state's oil production in a single month, yielding 828,661 of the 1,593,059 bbls. of oil brought to the surface in Michigan fields last month.

Buckeye's Dominant Place

Buckeye's production was within 143 bbls. a day of the record it set in October, its daily output last month being rated by the Oil & Gas Association of Michigan as 26,731 bbls. The total daily production for all the state's fields was 51,389 bbls.

Michigan's December oil production pushed the year's total to the predicted record, exceeding the previous banner year of 1935 by 610,846 bbls. The 1937 total of production was 16,410,751 bbls.

Buckeye field grew from three producing wells at the end of 1936 to 332 producers at the end of 1937, its production from a daily average of 30 bbls. at the close of 1936 to a daily average run of 26,731 bbls. at the end of the year just closed.

Here is the Oil & Gas Association report of December crude runs from all Michigan fields:

	Wells	Daily runs
Porter-Yost	426	8,158
Greendale-Chippewa	270	1,794
Geneva-Midland	3	31
Vernon-Leaton-Denver	95	1,374
Sherman-Isabella	52	5,361
Crystal-Winfield	80	953
Home-Vickeryville	9	99
Beaverton	27	339
Buckeye	332	26,731
Ogemaw	213	2,410
Adams-Arenac	5	135
Clayton-Arenac	38	585
Saginaw	55	23
Birch Run	25	91
Dundee-Monroe	3	27
Salem-Allegan	53	3,133
Muskegon	91	145
Totals	1,777	51,389

California Fields

(Continued from Page 119)

in Union Oil Co. No. 1-34 Kern County Land in the Rio Bravo field. No. 8-A Kern County Land of Ohio Oil Co. will prove or disprove the belief that the Rio Bravo sand underlies the entire San Joaquin Basin. In the Elk Hills field, Richfield Oil Corp. has completed No. 11-D-A in section 1-31-24 pumping 110 bbls. of 19.1-gravity from 3,359 feet. Production at last reports was still cutting around 20 per cent and the company may find it advantageous to re-enter the hole.

Shell Oil Co. ran into mechanical trouble in No. 72-A Kern County Land in the Canal field just on top of the pay while at 8,036 feet. A twist off left several stands of drill pipe in the hole and progress will be retarded until a recovery has been effected. In the meantime Ohio Oil Co., discoverer of the Canal field, is making hole in No. 4-E Kern County Land in section 13-30-25 east of the discovery well. In the Wasco district of Kern County, Continental Oil Co. has passed the 12,100-foot level in No. 2-A Kern County Land in section 8-27-24, but has not yet encountered the Rio Bravo sand. In the Rosedale section of Kern County, the company's No. 1-B Kern County Land in section 12-29-26 is redrilling at 9,480 feet with bottom of the hole at 10,205 feet.

Los Angeles Basin

No. 20 Monterey, of St. Helens Petroleum Co., which recently proved the existence of substantial Miocene production in the extreme western end of the Montebello field, is holding up in good shape although it has been severely pinched back due to the inability of the company's absorption plant to handle in excess of 2,000,000 feet of gas per day.

In the Long Beach field, Shell Oil Co. has recompleted No. 10 Pickler pumping 62 bbls. of 22.9-gravity oil cutting 3 per cent daily after redrilling and deepening the hole to 3,370 feet. In the Hilldon section of the Long Beach, west of the Los Cerritos area Union Oil Co. expects to have No. 4 Oil Operators ready for a production test within 10 days. This well, which is being whipstocked in order to save drilling costs, has been making good progress. The Oil Operators property requires construction of costly rig bases and for this reason wells are being drilled with directional equipment. Hilldon Oil Co., which proved the existence of commercial production in this area after one of the major companies had drilled two wells and quitclaimed the acreage, should have No. 3 Amebco on production within a week and the crew from this potential producer will be moved over to No. 1-A Bixby, the rig for which is now being erected. The importance of directional drilling in normal development is further emphasized this week as Union Oil Co. in addition to whipstocking a well in the Hilldon area is using direction drilling practice in No. 16 Del Rey in the Playa Del Rey field.

Kansas Developments

By
DAL DALRYMPLE

New Oil Areas in Stafford, Barton and Ness Counties

Several new pool discoveries and extensions to proven areas in Kansas were assured or indicated the past week, although field activity remained at a comparatively low ebb because of an insufficient market for crude oil. Completions of the week included 34 oil wells, one gas well and four dry holes.

Although 12 new outpost tests were reported the past week, the intensive drilling campaign that has been predicted for western Kansas in 1938 has been retarded due to lack of crude oil outlets. With total potential exceeding 3,000,000 bbls. of oil daily, the January allowable is only 186,472 bbls., necessitating strict proration and low percentages of production. Proven reserves are more than enough to meet market demands. The recently organized Kansas Independent Oil & Gas Association, headed by E. B. Shawver, Wichita producer, has as its goal a greater market for Kansas crude oil. A statewide membership campaign is scheduled as one of the first steps in this effort to increase outlets.

Despite the rather drab tinge to the market outlook, wildcat operators are expected to continue their exploration and required offsets and lease expirations will necessitate the drilling of many wells in proven areas. Many wells will be drilled in Kansas this year under any conditions and if, and when, a greater market is obtained a big increase in activity will follow.

North of Hudson

Another Stafford County producing area was indicated at Cardinal Oil Co. and others No. 1 Stittner, SW cor. section 4-22-12w, 4 miles north of Hudson. It had saturated Arbuckle lime in cores from 3,686 to 3,696 feet, set 7-inch casing on top of the lime and was due to be drilled in this week. Standard equipment was being installed. Location is on a farm-out lease from Stanolind Oil & Gas Co. Nearest production is in the new area opened last week at Stanolind's No. 1 Walker, NE NE SW section 33-21-12w, which had initial potential of 1,683 bbls. of oil daily.

Stanolind Oil & Gas Co. No. 1 McComb, NE NE NW section 26-24-11w, one-half mile south of production in the Zenith pool, Stafford County, flowed 37 bbls. of oil with tools in the hole at 3,812 feet, total depth, in Misener sand.

On the north side of Zenith, three new wells were started offsetting Stanolind Oil & Gas Co. No. 1 Volker, NW SW NE section 23-24-1w, which extends the pool one-fourth mile north. Stanolind No. 2 Volker, south offset to the north extensioner, is in NW SW NE section 23-24-11w. West and diagonal southwest offsets also were announced.

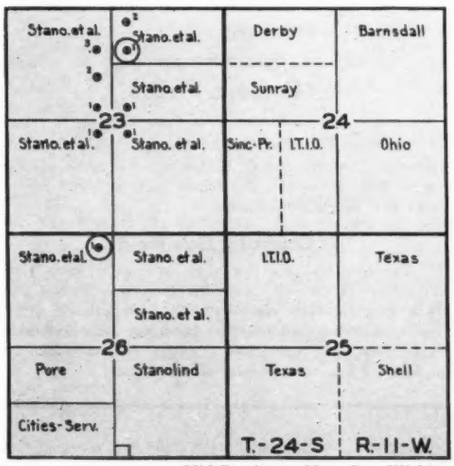
Opening of another producing area north of Zenith in eastern Stafford County and near the Reno County line was imminent at Torry & Feaster and others No. 1 Heggy, NE NE SW section 26-23-11w, 6 miles northeast of the town of Stafford. Top of Arbuckle lime was reported at 3,696 feet, unofficially, and it was shut down when oil began showing through rotary mud. A saturated core was taken at 3,653-58 feet, and other showings were reported. The well was said to be running high structurally. It is on a farm-out from Cities Service Oil Co.

Bemis Extended

The Bemis field, Ellis County, was extended one location westward at Republic Natural Gas Co. No. 1 F. A. Bemis, SE SW SW section 21-11-17w. It had Arbuckle lime at 3,468-3,473 feet, and oil rose 2,850 feet in the hole in four hours.

In Barton County, Thayer Drilling Co. and others No. 1 Soderstrom, SE SE NW section 21-17-13w, was a prospective pool opener. It swabbed at the rate of 3 bbls. of oil an hour for 12 hours at 3,230 feet in Lansing lime, with a small increase when deepened to 3,233 feet. Swabbing tests were being continued. Location is about 2 miles southwest of South Ainsworth pool and 2½ miles north of Hoisington. James A. Brouk and Perry A. Thayer are associated in this wildcat.

Elmer Ash and others No. 1 Frees, NW cor. section 34-16-11w, wildcat in northeastern Barton County, topped Arbuckle lime at 3,398 feet, and at 3,418 feet oil rose 100 feet in the hole in nine hours, with some water showing. It was to be deepened a few feet and acidized if water does not predominate. This test is about 2 miles north of production in the Kraft pool.



Mid-Continent Map Co., Wichita

The Zenith pool, Stafford County, was being extended north by Stanolind Oil & Gas Co. No. 1 Volker, section 23-24-11w, and south at No. 1 McComb, section 26

A Cowley Strike

Arbuckle lime production in the south end of the shallow Turner pool in central Cowley County was indicated at Deep Rock Oil Corp. No. 3 Cranston, NW SW NE section 30-32-6. It topped Arbuckle lime at 3,440 feet, total depth 3,447 feet, and had a good showing of live oil. An electrical survey disclosed additional pay horizons in Mississippi lime at 3,070-80 feet and 3,180 feet. Other wells in the Turner pool produce from the Upper Layton horizon.

Skelly Oil Co. has another big gas well in Pratt County at No. 1 Lunt, C NW section 18-28-11w, extending the Cairo field one-half mile southwest. It was acidized in Viola lime at 4,278-4,338 feet, and gauged 68,100,000 feet of gas daily.

Crawford County, in southeastern Kansas, claimed some attention the past week when Merton Marshall and associates found production in No. 11 Mitchell, 3 miles south and 1½ miles east of Walnut, in the northwestern corner of the county. It is considered one of the largest producers to be drilled in the shallow pools of the southeastern counties in several years. It had Bartlesville sand at 335-395 feet, total depth, and showed for an estimated 1,000,000 feet of gas and some oil. After a shot, oil flowed over the mast. Operators were preparing for a pumping test.

Wildcat completions of the week were as follows:

Completions Near Aldrich

Continental Oil Co. No. 1 Olson, SW NW SE section 5-18-25w, northeast extension of the Aldrich area in Ness County, was acidized and pumped 108 bbls. of oil in the first four hours, 118 bbls. in the next four hours, and made potential of 653 bbls. of oil, with some water. It topped Conglomerate at 4,284 feet, Mississippi lime 4,300 feet, had a showing of oil at 4,301-02 feet, set 7-inch casing at 4,301 feet, had a showing of oil at 4,309 feet, and was bottomed at 4,325 feet.

General Machine & Tool Co. No. 1 Jensen, SW SE NE section 26-12-18w, Ellis County, topped Kansas City lime at 3,387 feet, had a slight showing of oil at 3,387-90 feet, Conglomerate 3,623 feet, Simpson 3,668 feet, Arbuckle lime 3,675 feet, hole full of water at 3,708-11 feet, total depth, and was abandoned.

Jones & Shelburne No. 1 Short, NE cor. section 12-15-12w, Russell County, found Kansas City lime at 2,965 feet, Conglomerate 3,280 feet, Arbuckle lime 3,327 feet and was dry and abandoned at 3,338 feet, total depth.

Allison & Fitzwilliams and others No. 1 Hawks, SE SW NE section 16-24-1w, Harvey County, was dry and abandoned at 3,675 feet, total depth. It topped Mississippi lime at 3,146 feet and Hunton lime at 3,632 feet.

Estimated Daily Production

Estimated daily production of Kansas for the week ending January 15 and for the preceding week was as follows:

	Barrels	
	Jan. 15	Jan. 8
Oxford City	1,200	1,250
Burrton	10,100	10,225
Ritz-Canton	5,100	5,100
Graber	2,675	2,050
Hollow-Nikkel	2,300	2,325
Lerado	1,375	1,350
Voshell	2,075	2,100
Wellington	2,750	2,800
Ellsworth County:		
Lorraine	2,775	2,425
Other pools	1,195	1,125
Rice-Barton counties:		
Bloomer	3,150	2,950
Chase	5,200	4,550
Geneseo	2,675	1,600
Raymond	1,100	1,450
Silica—Silica West	16,100	9,875
Silica—South	3,400	
Keesling	1,050	950
Hauschild	1,175	725
Miscellaneous Rice	8,045	6,370
Miscellaneous Barton	5,525	6,885
Russell County:		
Fairport	1,725	2,220
Gorham	1,780	1,700
Russell	2,115	1,475
Sullivan	6,785	5,190
North Trapp	12,185	11,710
Miscellaneous Russell	8,695	6,190
Sedgwick County:		
Valley Center	1,020	1,060
Miscellaneous	2,270	2,375
Ellis County:		
Bemis	6,550	5,725
Miscellaneous	2,900	3,620
Kingman County	500	705
Stafford County	3,470	2,545
Greenwood County	9,700	9,750
Butler County	16,710	16,450
Other fields	24,830	25,830
Total Kansas	180,200	162,650

A Reno Failure

Westgate-Greenland Oil Co. and others No. 1 Popp, SW NE section 7-25-4w, Reno County, found Chat at 3,561 feet, had a showing of oil and gas at 3,549 feet, Kinderhook Dolomite 3,898 feet, showing of oil through a hole full of water at 3,900 feet; Viola lime 3,968 feet, Wilcox sand 3,990 feet, water 4,007-12 feet, Arbuckle lime 4,082 feet and was dry and abandoned at 4,136 feet, total depth.

New wildcats included a test in Thomas County, northwestern Kansas, at J. J. Muth No. 1 Conley, C SE section 4-10-35w, 15 miles southwest of Colby, county seat. Nearest production is in the Shallow Water pool, 66 miles to the southeast in Scott County. Location is about 30 miles from the Colorado line.

J. C. Shaffer, Inc., staked location for a wildcat in

NE NE SE section 20-24-11w, 2½ miles west of production in the Zenith pool, Stafford County.

Work was started at Pryor & Lockhart No. 1 Gant A, NW section 7-31-13w, outpost one-half mile northwest of the discovery well in the Lake City area, Barber County.

New Graham Wildcat

Cities Service Oil Co. and Continental Oil Co. No. 1 Trexler, CEL W half NE section 15-9-21w, is a new wildcat in Graham County, about midway between the Webster pool of Rooks County and Wakeeney pool, Trego County.

Merriam, Smith & Unruh No. 1 Stietlow, NW cor. section 32-11-14w, wildcat 6 miles east of the North Fairport pool, Russell County, was a rig.

Gulf Oil Corp. started work at No. 1 Klusener, SE cor. section 27-15-12w, Russell County wildcat, 2 miles northwest of Dubuque production.

Continental Oil Co. No. 1 Meyer, NE SE section 19-21-1w, outpost one-half mile west of production in the Graber pool, McPherson County, started work.

A. M. Landon and associates No. 1 Slough, NE SW section 9-24-13, wildcat north of production in the Blackwell pool, eastern Greenwood County, was a machine.

Bell Oil & Gas Co. and Lerke & Whorton No. 1 Bowers, NW NE NW section 18-34-12, Chautauqua County, and same operators' No. 1 Logsdon, SE NW SE section 16-31-9, Elk County, both wildcats, began operations the past week.

Outpost in Cowley

Tom Palmer started work at No. 1 Neimoller, NE cor. section 14-30-4, wildcat southeast of production in the Rock pool, Cowley County.

Work also was started at another Cowley County wildcat at Baden, Robinson & Brewer No. 1 McDaniels, NW cor. section 24-30-4, northeast of the David pool.

Regulations affecting wells in unprorated areas in Kansas, mainly in the eastern stripper counties, were announced by E. G. Dahlgren, director of the conservation division, Corporation Commission, in a letter to operators. He wrote:

"The oil statute exempts all wells that produce a daily average of less than 15 bbls. Wells producing more than 15 bbls. daily must be produced ratably and are exempt from proration regulations only under the following conditions:

"Sufficient market demand for all of the oil produced within the pool or common source of supply.

"Sufficient transportation facilities.

"Oil must be produced without underground waste.

May File Reports

"The commission has adopted the policy of ascertaining these conditions by permitting the producers to file a report in affidavit form which will show the production for each well for one month. If certain wells are producing more than 15 bbls. daily the commission will give the operators a hearing to determine market demand, transportation facilities and lack of underground waste.

"If certain producers prefer to take physical tests in lieu of filing the report, arrangements will be made to take tests and purchasing companies will be notified to withhold running oil from leases until reports are filed or tests have been made.

"Further reports will not be necessary when the commission is satisfied that the wells are below the minimum. In the case of wells above the minimum, if sufficient market demand, transportation facilities and lack of underground waste is proven, the commission will not require further reports unless there is a material change in conditions."

Eastern Fields

(Continued from Page 114)

In Wetzel County, J. P. Morgan and others completed a test on the C. C. McCormack farm in Magnolia district, in the Big Injun sand at 1,960 feet. It was dry in all formations.

Oriskany Gas Field

The best well for the week in the Oriskany pools in Kanawha County, West Virginia, was United Fuel Gas Co. No. 4766 on the Lillie Dawson and others lease in Poca district. The Oriskany was topped at 4,952 feet and there was a gauge of 18,000,000 feet a day with a total depth of 4,976 feet.

This company completed two additional wells in this district. No. 4762 Mamie A. Ray was bottomed at 4,811 feet with the Oriskany topped at 4,792 feet and it gauged 7,691,000 feet a day. No. 4739 W. J. Glass was bottomed at 4,748 feet with a gauge of 8,622,000 feet a day from the Oriskany topped at 4,737 feet.

In Elk district, the Columbian Carbon Co. is completing the test on the Dora Cavender and others lease as a gas well. The Corniferous was at 4,875 feet with the Oriskany topped at 4,974 feet and 608,000 feet of gas a day at 5,022 feet. In this district, this company topped the Corniferous lime at 4,863 feet in the test on the B. F. Jones farm.

In Poca district, the United Fuel Gas Co. reached the Corniferous at 4,962 feet in the No. 4763 C. L. Whittington farm, and at 4,714 feet in the No. 4783 Nina Chandler farm. R. E. McCabe topped the Corniferous at 4,753 feet in the test on the F. M. Ray, Jr., farm. In Union district, the United Fuel Gas Co. reached the same formation at 4,626 feet in the No. 4770 J. A. McCormick.

In Malden district, the South Penn Oil C. is drilling at 3,030 feet in the No. 4 Kate C. Scott farm. The Owens Illinois Glass Co. is down 4,664 feet in the L. A. Myers and others No. 12, same district.

In Elk district, operations have dwindled down to the following: The Columbian Carbon Co. has a location on the W. B. Fogarty farm and drilling the Nora Hamilton test and B. F. Jones test. The Cameron Oil & Gas Co. is fishing at 1,525 feet in No. 1 Henry Hansel. The Linden Drilling Co. shut down at 740 feet in the S. D. Robinson test.

Deep Tests

In Tygart district, Wood County, W. H. Bickel shot the test on the Reese Blizzard farm through the Oriskany sand and after standing for a week it showed no production.

In Tucker district, Wirt County, Carnegie Natural Gas Co. recovered the tools and line lost in the test on the W. O. Caplinger farm and shut down with the probability that drilling will not be resumed.

In Steel district, Wood County, the Belmont Quadrandle Co. still has the tools in the hole in the test on the C. D. White farm.

CONSOLIDATED OIL COMPANY

CRUDE OIL PRODUCERS

Col. W. T. (Bill) Knight
President

S. V. White
Vice President

A. H. Herron
Secretary-Treasurer

Hamilton Building

WICHITA FALLS, TEXAS

Rocky Mountain Area

By
T. R. INGRAM

Extensions in Lea County; Good Well in Lance Creek

DENVER, Colo., Jan. 17.—The Texas Co. and California Co.'s discovery on the Wilson Creek dome, Colorado, plugged back to the top of the Sundance to retest that horizon.

G. R. McConnell No. 1 Thomas-Government, North Big Hollow, Wyoming, has a show for a 25-bbl. well in the Muddy at 920 feet. Ohio Oil Co. No. 2 Union Pacific, at Simpson Ridge, was plugged and abandoned. Disposition of three black oil producing fields in Fremont County, shut in for 20 years, is the subject of a hearing by the interior department. Lance Creek has another large producer in the Minnelusa on the west side in the MacKinnie Oil & Drilling Co. No. 2 Thompson. The Ohio Oil Co. No. 5 Cash-O.P.C.-2 is being completed as a producer in the Sundance.

Montana had no completions and only one new operation.

NEW MEXICO

Interest in the Vacuum area, Lea County, was intensified the past week with completion of two new producers.

Texas Co. No. 1-M State, C SE NW section 1-18-34, was shut in after flowing at the rate of 672 bbls. of oil daily, naturally, through choke on tubing. It was bottomed at 4,550 feet in lime, 200 feet in the pay. This well is a west offset to the company's No. 1-L State, which was completed several weeks ago to extend the old Vacuum area 3 miles south and encourage drilling in a sector that promises to become Lea County's most active field.

Skelly Oil Co. No. 1-J State, C NE NW section 31-17-35, was completed to extend the south end of the pool one-half mile east. It had natural flow of 225 bbls. of oil through tubing in 24 hours, was acidized and flowed 375 bbls. of oil in 24 hours through various sized chokes. Ohio Oil Co. has started work at a south offset to this producer.

Barnsdall Oil Co. No. 1 Whitten, NE NE NW section 4-24-36, extended the northwest end of the Cooper pool, Lea County, one-half mile west. It was shot with nitro at 3,645-69 feet, total depth, and flowed 220 bbls. of oil in 12 hours through casing. It had bailed dry before shooting.

Atlantic Refining Co. and others No. 1 Davis, SW NW SW section 34-23-36, Cooper district, flowed at the rate of 77 bbls. of oil an hour and was completed at 3,610 feet, total depth.

Skelly Oil Co. No. 1 Johns, SW section 21-24-37, Lea County, was completed at 3,575 feet, total depth. flowing 355 bbls. of oil daily, with 2,000,000 feet of gas.

A new producing area was opened in Eddy County at W. A. Nichols and others No. 1 Johnson, NE section 35-16-31, wildcat, 3 miles northeast of the Jackson area, and southwest of some small producers. It flowed at the rate of 160 bbls. of oil daily through one-half inch choke after a shot at 3,887-3,911 feet. Total depth was 3,940 feet.

Lea County

Amerada Pet. Corp. No. 6 Byrd, SE sec. 12-20-36. Loc.
Amerada Pet. Corp. No. 2 Corrigan, C S½ SE NE sec. 4-22-37. T.D. 3,770 ft.; F. 59 B.O.P.D. through choke; may deepen.
Amerada Pet. Corp. No. 3 Laughlin, C NW NE sec. 9-20-37. T.D. 2,585 ft.; set 8-in. 2,573 ft.
Anderson-Prichard Oil Corp. No. 1 Wells, C SE SE sec. 5-27-37. Drlg. 3,610 ft.
Anderson-Prichard Oil Corp. No. 2 Langlie, SE sec. 8-25-37. Drlg. 3,325 ft.
Atlantic Ref. Co. No. 1 Grizzell, C SE NE sec. 6-22-37. T.D. 3,790 ft.; C.O. after reacidizing.
Barnsdall Oil Co. No. 1 J. Whitten, SE cor. sec. 33-23-36. T.D. 3,630 ft.; to acid.
Cities Service Oil Co. No. 2-A Clossen, NE sec. 18-22-36. Drlg. 2,938 ft.
Cities Service Oil Co. No. 1-H State, C NE NE sec. 17-22-36. T.D. 3,884 ft.; prep. to deepen.
Continental Oil Co. No. 3-B-6 Elliott, C SE SE sec. 6-22-37. T.D. 3,778 ft.; R.U.R.
Continental Oil Co. No. 1-B-9 Elliott, NW sec. 9-22-37. T.D. 1,204 ft.; rng. csg.
Continental Oil Co. No. 3-B-31 Lockhart, SE sec. 31-21-36. T.D. 3,924 ft.; acd.; tstg.
Continental Oil Co. No. 1-A-31 Marsh, SE sec. 31-20-39. Wildcat; T.D. 1,680 ft.; set 7⅝-in. csg. 1,671 ft.
Continental Oil Co. No. 1-B-23 Reed, NE cor. sec. 23-20-36. T.D. 3,752 ft.; set 5½-in. csg. 3,745 ft.
Continental Oil Co. No. 7-A-14 Sanderson, NE SW NE sec. 14-20-36. T.D. 2,740 ft.; S.D. repairs.
Continental Oil Co. No. 4-B-10 Sanderson, NE SE SE sec. 10-20-36. Drlg. 2,738 ft.
Cranfill & Germany No. 1 Weir, C NE NE sec. 15-20-37. T.D. 4,210 ft.; S.D.O.
Culbertson & Irwin No. 1 Alston, NW cor. sec. 26-25-37. T.D. 3,345 ft.; F. 75 B.O.P.D.; tstg.
Culbertson & Irwin No. 4-A Humphrey, NE SE NW sec. 3-25-37. Drlg. 3,180 ft.
Culbertson & Irwin No. 5-A Humphrey, NE NW SE sec. 3-25-37. T.D. 160 ft.; set 15½-in. csg.
Culbertson & Irwin No. 7-A Humphrey, NE SW SE sec. 3-25-37. Loc.
Culbertson & Irwin No. 1 Liberty Royalty, NW sec. 3-25-37. Drlg. 2,290 ft.
Dalport Oil Corp. No. 1 Leonard, C SE NW sec. 29-26-38. Wildcat; drlg. 1,320 ft.
Danglade & Clower No. 1 Clifton, C SW SW sec. 4-22-37. T.D. 3,528 ft.; set 7-in. csg.
Eastland Oil Co. No. 1 Waldrop, C SE SE sec. 1-20-38. T.D. 4,755 ft.; S.D.O.
L. E. Elliott No. 1 Elliott, NE NE SE sec. 26-20-36. T.D. 2,705 ft.; S.D. repairs.
Emperor Oil Co. No. 1 Johns, C SW NW sec. 24-17-32. T.D. 4,390 ft.; P.B. 4,360 ft.; acd.; tstg.
Empire O. & R. Co. No. 1-G State, sec. 2-21-36. T.D. 3,900 ft.; S.D.
Empire O. & R. Co. No. 2-B State, C SE SW sec. 2-21-37. Drlg. 3,875 ft.
J. E. Farrell No. 2-C Walden, C SE SW sec. 15-22-37. Drlg. 3,700 ft.
Geo. F. Getty No. 1 Riggs, NW sec. 1-26-37. Wildcat; T.D. 606 ft.; set 12½-in. csg. 600 ft.
Gulf Oil Corp. No. 1 Boyd, sec. 23-22-37. T.D. 3,681 ft.; tstg.
Gulf Oil Corp. No. 2 Cole, C NE NE sec. 16-22-37. T.D. 1,141 ft.; S.D.
Gulf Oil Corp. No. 1 Elliott, SW SE SE sec. 15-25-37. Drlg. 3,398 ft.
Gulf Oil Corp. No. 2 Elliott, C NE SE sec. 15-25-37. Drlg. 2,080 ft.
Gulf Oil Corp. No. 1 Greer, SW sec. 21-22-36. Drlg. 2,983 ft.
Gulf Oil Corp. No. 2-E Janda, NW NE NE sec. 21-23-36. T.D. 2,973 ft.; rng. csg.
Gulf Oil Corp. No. 1-D Mattern, SW sec. 6-22-37. Drlg. 2,260 ft.
Gulf Oil Corp. No. 1 LeMunyon, C NE NE sec. 28-23-37. Old well; T.D. 3,666 ft.; swbg.
Gulf Oil Corp. No. 2 Stebbins, C SW NW sec. 5-22-37. Drlg. 2,390 ft.
Humble O. & R. Co. No. 3 Williams, C SW NW sec. 34-24-37. T.D. 3,532 ft.
Jal Nat. Gas Corp. No. 2 Justis, NE sec. 20-25-37. T.D. 3,029 ft.; tstg.
Harry Leonard No. 1 Ginsberg, NW sec. 29-25-38. Wildcat; T.D. 775 ft.; U.R. csg.
Magnolia Pet. Co. No. 1 State G, NW NW NE sec. 34-17-34. T.D. 4,905 ft.; P.B. 4,794 ft.
Magnolia Pet. Co. No. 2 State-Bridges, sec. 14-17-34. T.D. 4,593 ft.; flow. 51 B.O. in 1 hr., naturally.
Magnolia Pet. Co. No. 3 State-Bridges, C NW SW sec. 23-17-34. T.D. 4,275 ft.; rng. csg.
J. A. Mascho No. 1 Cloyd, C SE SE sec. 20-22-23. Wildcat; T.D. 3,516 ft.; swedging csg.
McDowell & Weiner No. 1 Elliott, SE cor. sec. 19-21-37. T.D. 3,821 ft.; shot; C.O.
C. T. McLaughlin No. 1 Polhamus, NE sec. 9-24-37. T.D. 3,672 ft.; S.D.
C. T. McLaughlin No. 1 Imperial Royalties, NW SE NW sec. 9-24-37. T.D. 3,436 ft.; R.U.S.T.
National Drlg. & Prod. Co. No. 1 Flint, C NE NE sec. 29-20-34. Wildcat; drlg. 3,695 ft.
Ohio Oil Co. No. 2 Grizzell, C NW SE sec. 5-22-37. T.D. 600 ft.; prep. to drill in.
Ohio Oil Co. No. 1 Hardy, NE NE SE sec. 20-21-37. T.D. 3,612 ft.; drlg. by tools.
Ohio Oil Co. No. 1 Kutter D, C SW SW sec. 18-19-37. Drlg. 3,590 ft.
Ohio Oil Co. No. 7 State-McDonald, C SW SE sec. 16-22-36. T.D. 3,871 ft.; C.O.
Lem Peters No. 1 Graham, sec. 27-22-37. Drlg. 2,915 ft.
Parker Drlg. Co. No. 1 Irwin, C W½ SW SW sec. 35-24-37. T.D. 185 ft.; set 13-in. csg. 183 ft.
Phillips Pet. Co. No. 1 Hale, C NE SE sec. 35-17-34. Drlg. 3,640 ft.
Phillips Pet. Co. No. 1 New, C E½ NE NE sec. 26-20-36. Drlg. 2,910 ft.
Plains Prod. Co. No. 1 Humphreys, NE sec. 3-25-37. Loc.
Plains Prod. Co. No. 2 Moseley, SW NE SE sec. 34-24-37. Drlg. 2,850 ft.
Repollo Oil Co. No. 1 Powhatan Carter, SW SW NE sec. 9-24-37. T.D. 3,705 ft.; P.B. 3,600 ft.; F. 29 B.O. P.D.
Repollo Oil Co. No. 3 Christmas, NW NW NE sec. 28-22-37. Drlg. 3,644 ft.
Repollo Oil Co. No. 4 Roach, NW NW SW sec. 21-20-37. T.D. 3,875 ft.; P.B. 3,860 ft.; shot; R.U.S.T.; to C.O.
Repollo Oil Co. No. 4-D Stuart, SW sec. 10-25-37. Drlg. 245 ft.
Repollo Oil Co. No. 2 White, SE sec. 24-20-36. T.D. 3,850 ft.; rng. tbg.
Rowan Drlg. Co. No. 2 Elliott B, C NW NW sec. 9-22-37. T.D. 3,733 ft.; P.B. 3,705 ft.; tstg.
Rowan Drlg. Co. No. 2-A Elliott, C NE SW sec. 27-22-37. Drlg.
Samedan Oil Co. No. 5 Hughes, C NE SW sec. 10-23-37. Drlg. 1,450 ft.
Shell Pet. Corp. and Devonian Oil Co. No. 3 Christmas, C SW NE sec. 21-22-36. T.D. 3,855 ft.; P.B. 3,840 ft.; S.D.
Shell Pet. Corp. No. 2-L Endura-State, NE SE SE sec. 1-21-35. T.D. 3,905 ft.; acd.; shot; F. 20 B.F. in 6 hrs.
Shell Pet. Corp. No. 1 Grizzell, SE sec. 8-22-37. Drlg. 2,148 ft.
Shell Pet. Corp. No. 4-E State, C SW NW sec. 12-20-36. Drlg. 3,800 ft.
Skelly Oil Co. No. 1-J State, C NE NW sec. 31-17-35. T.D. 4,545 ft.; to acd.
Skelly Oil Co. No. 5 J. B. Baker, C SE NW sec. 27-22-37. T.D. 3,620 ft.; tstg.
Skelly Oil Co. No. 5 G. W. Sims, C SE NW sec. 10-23-37. Drlg. 2,987 ft.
Skelly Oil Co. No. 3 G. W. Sims, C NW NE sec. 9-23-37. T.D. 3,642 ft.; C.O.
Skelly Oil Co. No. 1-C R. R. Sims, sec. 3-23-37. Drlg. 3,688 ft.
Skelly Oil Co. No. 1-E W. P. Sims, C NW NE sec. 10-23-37. T.D. 3,625 ft.; flwd. 452 bbls. in 24 hrs.
Southern Pet. Exploitation Co. No. 2 Downes, C SW SW sec. 32-21-37. Cellar and pits.
Stanolind O. & G. Co. No. 13-A Giliuly, C SE NW sec. 24-20-36. Drlg. 3,704 ft.
Stanolind O. & G. Co. No. 1-A Hill, C NW SE sec. 6-21-37. Drlg. 3,679 ft.
W. H. Street No. 3 Woods, C NW NE sec. 22-22-37. Drlg. 2,950 ft.
Sun Oil Co. No. 2 Lanehart, C NE SE sec. 20-25-37. Drlg. 3,318 ft.
Texas Co. No. 2-B Cagle, SW sec. 15-26-37. T.D. 3,216 ft.; C.O. 3,080 ft.
Texas Co. No. 1 Corbin, C NW SW sec. 10-18-33. Drlg. 1,574 ft.
Texas Co. No. 1-M State, NW sec. 1-18-34. Drlg. 4,526 ft.
Texas Pacific Coal & Oil Co. No. 7-A State, Acct. 2, C NW NW sec. 8-22-36. T.D. 3,750 ft.; set 7-in. csg.
Texas Pacific Coal & Oil Co. No. 8-A State, Acct. 2, C SE SE sec. 7-22-36. Cellar and pits.
Two States Oil Co. No. 2 Downes, C NE NE sec. 6-22-37. Drlg.
Western Gas Co. No. 1 Cowden, SE cor. sec. 30-23-37. T.D. 3,560 ft.; to swab.

Eddy County

F. E. Baker No. 1 Eddy, NE sec. 12-22-27. Drlg. 1,825 ft.
Barnett Oil Dev. Co. No. 1 King Permit, C NW SE sec. 23-26-30. Drlg. 635 ft.
Ed Bryant No. 1 Stebbins, C NE SW sec. 19-20-29. T.D. 1,000 ft.; S.D.O.
Carper Drlg. Co. No. 2 Gissler, SW SE NW sec. 23-17-30. T.D. 3,688 ft.; S.D.O.
Danciger O. & R. Co. No. 3 Turner, SW NE SW sec. 18-17-31. T.D. 3,510 ft.; reacd.; to swab.
D. & B. Oil Co. No. 2 Jenkins, SW NW NW sec. 20-17-30. T.D. 3,265 ft.; est. 20 B.O. natl.; acd.
Etz Bros. No. 4 State, C S½ SE SE sec. 16-17-30. T.D. 3,253 ft.; F. 110 B.O.P.D. natl.; acd.
Finley & Cherry No. 1 Buchley, C NW NW sec. 28-16-31. Wildcat; T.D. 3,750 ft.; S.D.
Flint Prod. Co. No. 1-B State, SE sec. 20-17-30. Drlg. 3,830 ft.
Franklin Pet. Corp. No. 1 McIntyre, NE NW SW sec. 20-17-30. T.D. 3,146 ft.; S.D.O.
C. J. Frederick No. 1 Reed, C NE SW sec. 28-24-28. T.D. 1,170 ft.; S.D.O.
F. W. & Y. Oil Co. No. 7-A Gissler, NE sec. 23-17-30. T.D. 3,480 ft.; flwd. 180 B.O.P.D.; tstg.
F. W. & Y. Oil Co. No. 1-B Gissler, SW sec. 15-17-30. T.D. 470 ft.; set 8¼-in. csg.
F. W. & Y. Oil Co. No. 2-B Gissler, C NW NW sec. 24-17-30. Drlg. 2,990 ft.
F. W. & Y. Oil Co. No. 3 Jackson, C NW SE sec. 13-17-30. T.D. 2,953 ft.; fsg.
Geo. F. Getty, Inc., No. 1-E State, NE SW SW sec. 16-17-31. Drlg. 3,532 ft.
Grayburg Oil Co. No. 10 Burch, SE NE NE sec. 19-17-30. Drlg. 3,140 ft.
Grayburg Oil Co. No. 4 Keely, SE SW NE sec. 24-17-9. Drlg. 1,845 ft.
M. A. Grisham No. 1 Chaytor, NE sec. 10-24-26. T.D. 1,967 ft.; C.O.
H. A. Hartwell No. 1 Vandagrift, NE NE SE sec. 8-18-27. Drlg. 630 ft.
R. L. Holcomb No. 1 State, NW sec. 22-17-28. Drlg. 605 ft.
Woodworth Hawkins No. 1 Mack, C SW SW sec. 20-24-27. T.D. 1,640 ft.; S.D.O.
C. F. Ingram No. 1 Page, NE NE SW sec. 15-21-28. Drlg. 1,440 ft.
Nash & Windfohr No. 8-A Jackson, sec. 13-17-30. Drlg. 2,110 ft.
Nash-Windfohr & Brown No. 2-B Stevens, NW sec. 13-17-30. Drlg. 2,300 ft.
Red Lake Oil Co. No. 1 Williams, C SW NW sec. 21-17-28. T.D. 1,978 ft.; shot; to pump.
Repollo Oil Co. No. 3-D McIntyre, SE cor. sec. 17-17-30. T.D. 2,905 ft.; rng. csg.
Repollo Oil Co. No. 1-A Parke, NW NE NE sec. 22-17-30. T.D. 3,237 ft.; straightening hole.
Repollo Oil Co. No. 2 West, SW SE SE sec. 9-17-31. T.D. 3,757 ft.; P.B. 3,727 ft.; F. 68 B.O.P.D.; swedging csg.
Paul Sargent No. 1 State, NE sec. 16-17-31. T.D. 3,749 ft.; P.B. 3,745 ft.; tstg.
R. A. Shugart No. 1 Coulthard, C NW SW sec. 35-18-31. Drlg. 3,970 ft.; swbg. 65 to 75 B.O.P.D. while drlg.
Texas Co. No. 1 Welch, sec. 30-20-31. T.D. 860 ft.; S.D.O.
W. K. Royalty No. 2 State, C NE NW sec. 16-17-31. R.U. mch.
W. O. Snyder No. 1 Pecos Irrigation, C NE SE sec. 15-25-28. T.D. 3,006 ft.; S.D.O.

Martin Yates, Jr. No. 1 Conlon, SW NW NW sec. 7-24-27. Drlg. 790 ft.

Chaves County

English & Hamon No. 11 Billingslea, SE sec. 9-15-29. T.D. 3,680 ft.; P.B. 3,456 ft.; reshot at 3,383-93 ft.; 1 bailer oil and 1 bailer wtr. an hour; may reshoot.
E. J. Fisher No. 1 Etz Permit, NE sec. 23-7s-26. Drlg. 870 ft.
J. & L. Drlg. Co. No. 2 Hurd, SW sec. 11-11-26. M.I.M.
Mathieson et al No. 1 Code, C NE NW sec. 19-15-27. T.D. 1,170 ft.; S.D. for csg.

Curry County

Bond & Harrison No. 1 Hart ranch, C NW SE sec. 13-2n-31. T.D. 3,258 ft.; S.D.O.

De Baca County

Land Owners Oil Co. No. 1 McAdoo, SW cor. sec. 16-1s-7e. O.W. prep. to deepen from 5,850 ft.
James D. Ward No. 1 Summers, NW NE SW sec. 17-4n-20. T.D. 260 ft.; S.D.; flwg. wtr.
N. F. Woods No. 1 Jones, C NE SW sec. 17-4n-20. T.D. 25 ft.; S.D.

Dona Ana County

Jules C. Bertrand No. 1 Casad Permit, sec. 24-26-5e. T.D. 47 ft.; S.D.O.

McKinley County

S. Dysart No. 1 Govt., NE sec. 14-14-10w. T.D. 1,390 ft.; fsg.

Otero County

George Mulvey No. 1 State, SW cor. sec. 11-25-8. T.D. 263 ft.; S.D.
Fred Turner, Jr. No. 1 Ella Everett, C SE SE sec. 34-22-13. Drlg. ahead.
Fred Turner, Jr. No. 1 H. V. Everett, C SE SE sec. 28-22-13. Spd. and S.D.

Roosevelt County

C. S. Peterson and Conquistadores Oil Co. No. 1 Good, NW SE SE sec. 28-5s-30. T.D. 455 ft.; S.D.O.

NORTHWEST NEW MEXICO

San Juan County

Continental Oil Co. No. 69 Rattlesnake, SE NW SE section 2-29n-19w, Rattlesnake field, was plugged and abandoned at 851 feet.

C. E. Brawley No. 1 Godrun, C SE SW sec. 34-30n-11w. Drlg. below 50 ft.; C.D.
Continental Oil Co. No. 67 Rattlesnake, C SE sec. 2-29-19w. Filled hole to surface and started new hole.

COLORADO

Cheyenne County

Gulf Oil Corp. No. 1 Union Pacific-Larson, C SE NW sec. 13-13s-49w. Drlg. 2,825 ft. in L. and gypsum; top Dakota 2,075 ft.

Grand County

Interstate Oil & Ref. Co. No. 1 Hinman, NE SE NW sec. 11-2n-81w. Drlg. 2,685 ft.

Las Animas County

Garcia Corp. No. 1 McClung, NE NW SE sec. 19-33s-61w. T.D. 2,000 ft. (C.D.) in sd.; S.O. and G. at 1,955 ft.; U.R. 10-in. through Glorietta sd.

Park County

South Park Oil Co. No. 1 Lemar, NE NE SE sec. 34-11s-75w. Drlg. 5,588 ft.

Pitkin County

Glenco Dev. Co. No. 1 Govt., NW cor. sec. 9-10s-89w. S.D. 2,808 ft. to make new contr.

Rio Blanco County

The Texas Co. and the California Co. in their joint operation, No. 1 Unit, the discovery well on the Wilson Creek structure, is preparing to retest the Sundance sand at a total depth of 6,918 feet. Hole has been plugged back to the top of the Sundance at 6,824 feet and 5 feet of cement will be drilled at a time after which the walls will be scraped and a Halliburton test run. This will continue for an undetermined depth. In the first test the cores showed 74 feet of saturated sand in the Sundance with some water, believed to be at the bottom. It is probable that casing will be set on top of the Sundance and perforated opposite the Morrison and that horizon produced through the casing and the Sundance through the tubing. It probably will be two or three weeks before the well is completed and final tests made.

WYOMING

Albany County

G. R. McConnell No. 1 Thomas-Government, in the North Big Hollow district, has a show for 25 bbls. per day of black oil in the Muddy at 890-920 feet and is shut down for a test by the district engineer of the U. S. Geological Survey before drilling deeper. Location is to the north of several tests drilled last year by the Ohio Oil Co. and 4½ miles west and half a mile north of the Ohio No. 1 Styles, which went to the Tensleep at 3,003 feet, where it was abandoned.
G. R. McConnell No. 1 Govt., CWL SW SE sec. 6-15n-75w. S.D. 920 ft.
Wyco Oil Co., Inc., No. 3 Chappel, NE NE NW sec. 33-21n-76w. Drlg. 2,546 ft.

Carbon County

The Ohio Oil Co. No. 2 Union Pacific, SW SW SE section 17-21n-80w, Simpson Ridge structure, which ran into steep dips at 4,534 feet and plugged back to 765 feet and set whipstock to deflect hole, cored 10-degree dips to 1,240 feet, at which depth the hole is being abandoned.
Italo Pet. Co. No. 1 Tunney-Bragg, NE SE NW sec. 11-26n-81w. Spdg.
Sinclair-Wyoming Oil Co. No. 12-B Wertz, SE NW NW sec. 7-26n-89w. Drlg. Wall Creek sd. at 2,175 ft.; top at 2,168 ft.
Ohio Oil Co.-California Co. No. 4-A Kyle, 661 ft. from N line and 648 ft. from E line, sec. 26-21n-79w. Drlg. 2,055 ft.
Ohio Oil Co. No. 13 Harrison & Cooper, SW SE SW sec. 35-20n-78w. T.D. 3,157 ft.; tstg. Sundance.
Ohio Oil Co.-California Co. No. 4-B Kyle, C SW SW sec. 24-21n-79w. W.O. rig.
Ohio Oil Co.-California Co. No. 6 Union Pacific-Johnson, C SW SE sec. 23-21n-79w. Drlg. 4,164 ft.
Producers Oil Co. No. 1, CNL sec. 14-20s-88w. Drlg. 194 ft.
Ohio Oil Co.-California Co. No. 5 Cronberg-U.P., C NW NW sec. 25-21-79w. S.D.O. 5,765 ft.
Medicine Bow Oil Co. No. 1 Hintze-Govt., C NE SE sec. 18-22n-78w. S.D. 2,347 ft.

Converse County

New Era Fuel Corp. No. 1 Layne, SE NW NE sec. 27-32n-69w. T.D. 560 ft.; cmtd. 6⅝-in. at 525 ft. for W.S.O.; S.G. 490 ft.
New Era Fuel Corp. No. 1 Gaspar, NW NW SW sec. 25-32n-69w. Cmtd. 6⅝-in. on bttm. at 525 ft.
D. O. Gray No. 1 Wm. Lane, SW SE SE sec. 22-32n-69w. Drlg. 275 ft.
Chadron-Osage Oil Co. No. 1 O'Meara, NE NE sec. 28-32n-69w. Drlg. 200 ft.
Putnam et al No. 1 Probesh, SE SE sec. 29-32n-69w. Drlg. 250 ft.
Kaufman & Quinlan Bros. No. 1 Lane, SE NW NE sec. 27-32n-69w. R.U. mach.
Ainsworth Oil Co. No. 1 Marberger, NE SE NE sec. 34-32n-69w. T.D. 619 ft.; rng. 6⅝-in. for W.S.O.
Hail-Thornton et al No. 1 Roth, C NW SE sec. 13-32n-69w. Cmtd. 6⅝-in. at 500 ft.; drlg. plug.
Osage Trust Co. No. 1 Miller-Govt., SE NW NW sec. 29-32n-69w. Set 8¼-in. on bttm. at 425 ft.; drlg. plug.

Fremont County

Sinclair-Wyoming Oil Co. No. 2-B Muskrat, NW NW NE sec. 4-33n-92w. T.D. 3,225 ft.; drld. out past parted pipe and prep. to resume.
Stanolind O. & G. Co. No. 1 Govt., C SE SE sec. 3-33n-96w. Cg. 7,013 ft.; showed for 1,000,000 ft. of gas in Frontier at 6,760-6,930 ft. on D.S.T.

Hot Springs County

The Italo Petroleum Corp. No. 1 Phebus-Government, NW NW SW section 11-44n-98w, which extended the Hamilton dome field three-fourths of a mile to the northwest in the Tensleep at 3,206-46 feet, pumped at the rate of 100 bbls. per day on a four-hour test.
Italo Pet. Corp. No. 1 Skelton-Govt., SE SW NE sec. 13-44n-98w. Spd. and S.D. to comp. rig.

Natrona County

General Pet. Corp. No. 1 Govt., C NW SE sec. 21-35n-77w. Drlg. 5,341 ft. in gr. sh.
Western Producers, Inc., No. 1 Govt., NW SW SE sec. 5-39n-78w. Drlg. 1,012 ft.
Stanolind O. & G. Co. No. 11 Wyo. Asso.-T.P.-35, C NE SW sec. 35-40n-79w. Drlg. r.b. 3,883 ft.
Stanolind O. & G. Co. No. 8 T.P.-Wyo.-Asso.-35, C NW NW sec. 35-40n-79w. Cmtd. 9⅝-in. at 2,994 ft.; through Sundance at 2,879 ft.

Niobrara County

Another well proving the Minnelusa sand on the west side of Lance Creek good for large production was completed in the MacKinnie Oil & Drilling Co. No. 2 Thompson, NW NW NE section 7-35n-65w. It had the top of the Upper Minnelusa at 5,271 feet and cored to 5,294 feet, total depth, still in saturated sand. From the 23 feet of sand it showed for 52 bbls. per hour on a Halliburton test and on an 18-hour test through the open tubing it averaged 62 bbls. an hour. The oil tested 43.9 gravity, corrected to 60° F.

The well is a diagonal offset on the southeast to the Cobb-Holly No. 2 Novick, which made 94 bbls. an hour on an eight-hour test from sand at 5,252-73 feet. Elevation of No. 2 Thompson is 4,447 feet.

The Ohio Oil Co. No. 5 Cash-O.P.C.-2, C NW NE section 4-35n-65w, on the east side of the Sundance pool and in territory which was considered doubtful in that horizon, was completed as a good producer in the Sundance. Last report credited it with flowing 500 bbls. per day from the basal Sundance at 4,091-4,129 feet. Total depth is 4,131 feet and elevation 4,403 feet. It is an offset on the east to the same company's No. 9 Carrie Putnam, which made 850 bbls. initially at 4,186 feet, total depth.

The Continental Oil Co. No. 6-B Schuricht, SW SW SE section 6-35n-65w, is a near completion in the Minnelusa at 5,179-5,263 feet. It showed for 24 bbls. in nine hours and has since increased to 10 bbls. per hour. It will be acidized with 4,000 gallons.

Argo Oil Co. No. 6 Ford, NW SW NW sec. 33-36n-65w. Cellar and pits (first report).
C. L. Price No. 1 Lamb, NE NW NW sec. 7-35n-65w. Drlg. 3,000 ft.
Ohio Oil Co. No. 8 Converse Sheep, NE SE SW sec. 32-36n-65w. Drlg. 4,120 ft.; top r.b. 3,778 ft.; tstd. 8,000,000 ft. gas in basal Sundance 3,723-49 ft.
Continental Oil Co. No. 6-B Schuricht, SW SW SE sec. 6-35n-65w. T.D. 5,261 ft.; tstg.
J. M. Huber Corp. No. 1 H. & M., NE NE NE sec. 8-35n-65w. W.O. rig.
J. M. Huber Corp. No. 1 Joss, NE SE NW sec. 6-35n-65w. T.D. 4,096 ft.; O.W.D.D.; M.I.R.
Lewis Goekel No. 1, NE SE NW sec. 31-35n-62e. Resumed drlg. 1,550 ft.
Continental Oil Co. No. 3 Apex-1, SE SE NE sec. 34-36n-65w. T.D. 5,480 ft.; cmtd. whipstock to drill by.
W. A. Maupin et al No. 1 Berggren, NW sec. 23-35n-63w. Drlg. 180 ft.
Ohio Oil Co. No. 2 Leo-O.P.C., NE NE SE sec. 35-36n-65w. Rig; stdg.
MacKennie Oil & Drlg. Co. No. 3 Thompson, NW NW NE sec. 7-35n-65w. Cellar and pits; W.O. tools.

Park County

Ohio Oil Co. No. 4 Mack-O.P.C.-4, NE NW NE sec. 30-58n-99w. Drlg. 1,843 ft.

Platte County

Dividend O. & R. Co., Inc., No. 1, CSL NW SW sec. 17-24n-66. Drlg. 2,415 ft.; C.D.

Sweetwater County

The Sinclair-Wyoming Oil Co. No. 77, in the Lost Soldier field, an offset to the discovery in the Tensleep, is a near completion. It is bottomed in saturated Tensleep at 3,994 feet and is waiting on cement after setting the 7-inch at 3,979 feet. Top of the Tensleep was at 3,989 feet and top of saturation at 3,991 feet. The well it offsets is No. 75-A, drilled by the Prairie Oil & Gas Co. in 1930 and completed in the Tensleep at 4,005 feet for 2,500 bbls. initial of 35-gravity oil.
Selegna Oil Co. No. 1 Union Pacific, SW SW sec. 11-20n-104w. Drlg. 1,900 ft.; objective Sundance at 4,250 ft.; North Baxter Basin (first report).
Rocky Mountain Drlg. Co. No. 1 Lee, NE NW SE sec. 10-19n-104w. Cmtd. 13⅜-in. on bttm. at 380 ft.
Mountain Fuel Supply Co. No. 1 Agnes Fay, 330 ft. from E line and 1,980 ft. from S line, sec. 18-18n-103w. Drlg. 2,073 ft. above Dakota.
Rocky Mountain Drlg. Co. No. 1 Osborne, SE SE SE sec. 12-18n-104w. Drlg. 2,493 ft.; 3,000,000 ft. gas at 2,480 ft.
Mountain Fuel Supply Co. No. 1 Hoyt, SW SW SW sec. 32-19n-103w. Drlg. 2,345 ft.
Mountain Fuel Supply Co. No. 1 Lauzer, NW NW NW sec. 30-18n-103w. T.D. 1,857 ft.; tstd. 3,000,000 ft. gas in Frontier 1,690-1,857 ft.; rmg. 10-in. hole to set pipe and D.D.
Mountain Fuel Supply Co. No. 1 Clark, NW SE SW sec. 12-19n-104w. S.D. 300 ft.
Italo Pet. Corp. No. 1 Govt., SW SW SW sec. 36-13n-95w. S.D. 610 ft.
Sinclair-Wyoming Oil Co. No. 77, SE NE NE sec. 10-26n-90w. Cmtd. 7-in. at 3,979 ft.; 600 sacks.
Mountain Fuel Supply Co. No. 1 Union Pacific, C SW SE sec. 13-17n-104w. T.D. 3,330 ft.; P.B. to 3,241 ft.; S.D. for winter.
Mountain Fuel Supply Co. No. 1 Union Pacific, C SE NE sec. 29-15n-104w, S of Baxter Basin. Loc.

Uinta County

E. A. Ottman et al No. 1 Govt., C SE NW sec. 26-14n-110w. Drlg. 1,230 ft.; S.S.O.

Washakie County

Lewis Storm No. 1 Brome, C SE SW sec. 30-48n-90w. S.D. 1,750 ft. for csg.

Weston County

Production in the Osage field in December was 21,374 bbls. and deliveries to refiners were 20,000 bbls. from the field. Severe weather and bad road conditions reduced the production and demand.

One well was completed in the Osage Trust Co. No. 28, CEL NE SW section 14-46n-64w, which will pump 20 bbls. per day after shot from sand at 1,857-66 feet.

Only one well is active in the field and most of them will not resume until weather conditions are better in the spring.

Chas. F. Martens No. 8, SW SW NW sec. 24-36n-64w. Loc.
Osage Trust Co. No. 1, SE NW NE sec. 22-36n-64w. Drlg. below 500 ft.
John Brorphy No. 1 George, SW SE NW sec. 26-48n-64w. Drlg. 1,864 ft.; 470 ft. in Minnelusa.

MONTANA

Production in Montana in November, as reported by the State Oil Conservation Board, was 384,508 bbls., a decrease of 58,448 bbls. as compared with October. Oil in storage at the end of November was 1,355,208 bbls., an increase of 42,094 bbls. Exports to Canada were down to 18,477 bbls.

Carbon County

R. C. Tarrant No. 2 Heare, NW SE NW sec. 14-6s-10e. Cmtg. cave at 1,610 ft.
Miracle Oil Co. No. 2, CWL, NE SE sec. 3-6s-23e. Res. at 1,640 ft.
Geo. Muth et al No. 1, CSL SE SE sec. 23-6s-23e. S.D. indef. at 1,500 ft.
Henderson Prod. Co. No. 1-H-11 Elk. 11, SE SE NW sec. 35-9s-23e. S.D. 1,626 ft. for 8¼-in.; top Frontier 1,608 ft.; small S.O.
Sha-Wa Pet. Co. No. 1 Govt., SW SW NE sec. 35-9s-23e. Drlg. 2,705 ft.
Sha-Wa Pet. Co. No. 2 Govt., SW SE NE sec. 35-9s-23e. Loc.; Greybull sd. test.

Glacier County

A. B. Cobb No. 1 State, C NE NE sec. 30-37n-4w. T.D. 2,592 ft.; S.D. until spring.
Jack Marshall No. 2, All.-119, SE SE NW sec. 1-32n-6w. Drlg. 1,250 ft.; Colo. 660 ft.; 10¾-in. 685 ft.

Hill County

W. E. Drought No. 1, C SW SE sec. 12-34n-17e. M.I. mach.

Judith Basin County

Fletcher E. Hunt No. 3, NW SE NE sec. 30-44n-15e. S.D. 1,760 ft.; C.D.

Lewis and Clark County

Lewis & Clark Oil Synd. No. 1 Lewis & Clark, NW NW SW sec. 11-18n-5w. Drlg. 1,500 ft.

Toole County

Big West Oil Co. No. 5 Gunderson, SW NE NW sec. 19-35n-2w. Drlg. 500 ft. (first report).
West Kevin Community Lease, Inc. No. 1 McClary, SW NE NW sec. 3-34n-4w. Drlg. 650 ft.
Superior Pet. Co. No. 7 Govt., NE NW NW sec. 12-35n-3w. Drlg. 800 ft.
R. G. Parrant No. 1 Anderson, C SW SE sec. 26-35n-4w. S.D. 90 ft.
Henry Vander Pas No. 1 Thompson, SE NW NW sec. 33-35n-3w. T.D. 1,707 ft. in top Ellis; good S.O.; will acid.

UTAH

Summit County

Longwell Pet. Co. No. 1, SE SW SE sec. 35-3n-5e. T.D. 2,502 ft. in sh.; prep. to lower 6⅝-in. for W.S.O.

NORTH DAKOTA

Williams County

California Co. No. 1 Kamp, C NW NE sec. 3-154n-96. Drlg. 6,585 ft.

East Texas Fields

(Continued from Page 127)

Estate, 3,626-3,762 feet, 3,600 bbls. per day; No. 2-A Mangold, 3,606-3,750 feet, 2,500 bbls. per day. King Oil Co. and others No. 2 Mangold, 3,665-3,766 feet, 745 bbls. per day. Murray & Griffey No. 1 J. R. Pace, 3,720-3,925 feet, 100 bbls. per day. W. B. Omohundro No. 2 First National, 3,686-3,712 feet, 1,100 bbls. per day. H. A. Schaffer Oil Co. No. 2 First National, 3,652-3,820 feet, 600 bbls. per day. Staley Oil Co. No. 1 First National, 3,690-3,760 feet, 230 bbls. per day.

EAST CENTRAL TEXAS COMPLETIONS

Franklin County

In the Talco pool, Grey & Wolfe No. 7 Bolin, 4,246-4,317 feet, pumped 312 bbls. per day. Humble Oil & Refining Co. No. 5 King, 4,260-4,305 feet, pumped 70 bbls. per day. Magnolia Petroleum Co. No. 11 Owins, 4,197-4,300 feet, 250 bbls. per day. Stroube & Stroube No. 7 Hedricks, 4,267-4,312 feet, 364 bbls. per day.

Henderson County

O. R. Howard No. 2 Barton, 4,072-77 feet, 140 bbls. per day.

Madison County

Faucett & Kyle No. 1 Baily, dry and abandoned at a depth of 1,760 feet; No. 1 Cannon, dry and abandoned at a depth of 1,630 feet.

Titus County

In the Talco pool, Humble Oil & Refining Co. No. 12 Monnigs Dry Goods Co., 4,195-4,320 feet, 295 bbls. per day. Lucey Petroleum Co. No. 13 Williams, 4,225-70 feet, 367 bbls. per day.

Trinity County

C. O. Bond No. 1 Texas Long Leaf, dry and abandoned at a depth of 4,012 feet.

EAST TEXAS FIELD COMPLETIONS

(All one-hour gauges)

Gregg County—Longview Area

General American No. 23-A M. Adams, 3,574-3,585 feet, 72 bbls. Humble Oil & Refining Co. No. 31 T. B. and T. D. Harris, 3,457-3,520 feet, 54 bbls. Magnolia Petroleum Co. No. 10 C. Jones, 3,646-60 feet, 60 bbls. Shell Petroleum Corp. No. 7 M. C. Slater, 3,705-15 feet, 60 bbls. Stanolind Oil & Gas Co. No. 9-A B. Jones, 3,610-80 feet, 56 bbls.; No. 29-B F. K. Lathrop, 3,598-3,633 feet, 9 bbls. Tide Water-Stanolind No. 5 G. B. Tennery, 3,565-84 feet, 60 bbls. W. F. Turner and others No. 11 A. Jones, 3,615-50 feet, 60 bbls. Yeager & Schuler No. 7 G. Anderson, 3,490-3,505 feet, 78 bbls.

Gregg County—Kilgore Area

Arkansas Fuel Oil No. 39 Hughey-Ross, 3,525-49 feet, 64 bbls. T. J. Carter No. 4 Foltz and others, 3,535-38 feet, 40 bbls. Grace Oil Co. No. 4 M. B. Hughey, 3,500-09 feet, 70 bbls. Gulf Oil Corp. No. 29 Muckleroy, 3,540-55 feet, 62 bbls.; No. 28 R. H. Still, 3,535-70 feet, 50 bbls. H. S Moss No. 5-A F. Marshall, 3,527-49 feet, 44 bbls. Reserve Development Co. No. 6 R. Brown, 3,571-3,620 feet, 50 bbls. Shell Petroleum Corp. No. 18 Willoughby, 3,534-3,600 feet, 90 bbls. Southport Petroleum Co. No. 5 I.& G.N.R.R., 3,530-39 feet, 6 bbls.

Rusk County

McDonald Brothers No. 6 Brock Estate, 3,632-36 feet. 60 bbls. L. L. Sugar No. 4 T. H. Gill, 3,624-25 feet, 15 bbls. Sun Oil Co. No. 28 J. R. Beal, 3,592-94 feet, 25 bbls. Gulf Oil Corp. No. 12 Alford, 3,742-42½ feet, 30 bbls. Humble Oil & Refining Co. No. 60 A. D. Blackwell, 3,701-02 feet, 70 bbls.; No. 61 A. D. Blackwell. 3,697-98 feet, 70 bbls.; No. 16 Jones-Fuller, 3,685-86 feet, 80 bbls.; No. 7-A W. P. Moore, 3,690-92 feet, 80 bbls. Marr Drilling Co. No. 6 G. Gossett, 3,676-77 feet, 12 bbls. Neek Oil Co. No. 1 J. W. Shaw, abandoned location. Octo Oil Co. No. 3 Deason, 3,600-45 feet, 47 bbls. Stanolind Oil & Gas Co. No. 10-B M. Schuler, 3,632-81 feet, 30 bbls.

Upshur County

E. P. Halliburton No. 11 Phillips, 3,660-62 feet, 52 bbls. Humble Oil & Refining Co. No. 12 Phillips, 3,655-76 feet, 44 bbls. T. P. Looney No. 2-A Shelton, junked and abandoned at 3,722 feet. Rancho Oil Co. No. 19 Edwards, 3,614-30 feet, 75 bbls. Shell Petroleum Co. No. 6 Brawley, 3,696-3,700 feet, 60 bbls. Sun Oil Co. No. 23 Hargraves, 3,704-08 feet, 20 bbls.

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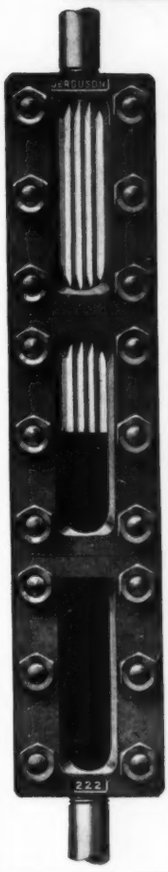

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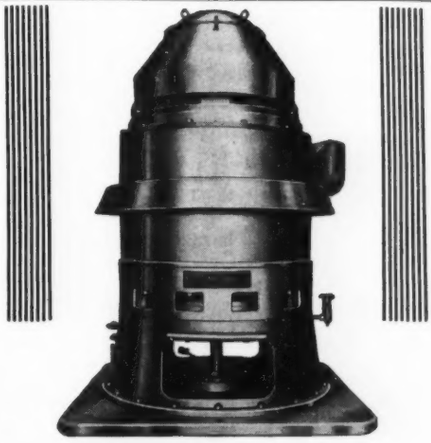

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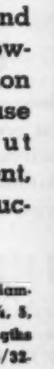

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Canadian Fields

Completions and Operations in Northwest and in Ontario

By VICTOR LAURISTON

CHATHAM, Ontario, Jan. 17.—Alberta crude and naphtha production in November established a new monthly high, with 326,677 bbls., compared with 325,723 bbls. in October. The production for all Canada was 341,517 bbls. against 342,452 bbls.

In November, Turner Valley limestone production was 322,736 bbls. compared with 322,237 bbls. the previous month. Turner Valley shallow crude production declined from 928 to 914 bbls., while Red Coulee light crude increased from 1,133 to 1,150 bbls. Wainwright heavy crude was down from 1,143 to 830 bbls. The Dina-Ribstone field increased from 282 to 447 bbls., while there was in November an estimated output of 600 bbls. of light crude from Moose Oils No. 2 on the Moose dome.

Completions

On the west flank of South Turner Valley, Commoil No. 1, LSD 15, section 29-18-2w5, bottoming in the Madison limestone at 7,475 feet, was treated with 7,800 gallons of acid. Previously making around 1,300 bbls. naturally, after acidizing it blew in with flush production of around 6,000 bbls. and made 4,493 bbls. on the first 24-hour test. The gas flow increased from 1,500,000 feet to between 10,000,000 and 12,000,000 feet. The official test of potential by Alberta officials, showed a settled flow between 3,100 and 3,200 bbls., prorated at 1,085 bbls. It is the largest producer completed in Turner Valley, the previous record being established by Davies-Royalite No. 2, LSD 13, section 21-18-2w5, with flush after acidization of 4,500 bbls. and settled potential around 3,000 bbls. It is a half mile west and slightly north of Turner Valley Royalties No. 1 discovery, being the most westerly producer. Commoil, Ltd., is a subsidiary of Commonwealth Petroleums, Ltd. Commoil No. 2 will be drilled in LSD 10, same section, on the south end of the 80-acre lease.

In section 20-18-2w5, Sunset Oils No. 1, LSD 10, completed in the Madison limestone at 7,475 feet with natural potential around 1,000 bbls., has provided 5,500 bbls. of tankage and is being acidized. In section 28-18-2w5, Richland Royalties No. 3, LSD 14, which has been making close to 100 bbls. a day from the lime, will be acidized as soon as Richland No. 2 is finished.

Tests in the Lime

In west central Turney Valley, Brown Oil Corp. No. 3, LSD 15, section 19-19-2w5, is below 6,586 feet, after getting Madison limestone at 6,335 feet. This is the only west side test now drilling in the northern end of the west-central area, and production will open a wide territory.

In section 28-18-2w5, Richland Royalties No. 2, LSD 5, is in a hard formation below 6,623 feet after getting Madison at 6,410 feet with over 500,000 feet of gas.

Okalta Structure

On the Okalta fold, west of the main Turner Valley structure, Okalta Oil Co. No. 6, LSD 3, section 30-18-2w5, is below 3,650 feet, underreaming and carrying 10¾-inch casing. This will be cemented at 3,800 feet and the hole finished with rotary tools.

West Side Drilling

In section 32-18-2w5, Royaltie Oil Co. No. 28, LSD 16, is below 5,674 feet. Royalite No. 30, LSD 11, is rigging. Davies Petroleums No. 1, LSD 2, is in the Lower Benton formation below 4,920 feet after getting the cardium marker at 4,625 feet. Sunburst Oil Co. No. 1, north half same LSD, is in the Lower Bentons below 5,197 feet and getting close to the grit beds.

In section 21-18-2w5, Brown Oil Corp. No. 4, LSD 4, offsetting Prairie Royalties No. 1 producer to the northeast, is below 4,190 feet.

In section 20-18-2w5, Spy Hill Royalties No. 1, LSD 16, is below 6,323 feet. Intercity Royalties No. 1, LSD 11, has cellar started. York Oils No. 1, LSD 2, is working on derrick.

In section 9-18-2w5, National Petroleum Corp. No. 2, LSD 14, is resuming

(Continued on Page 145)

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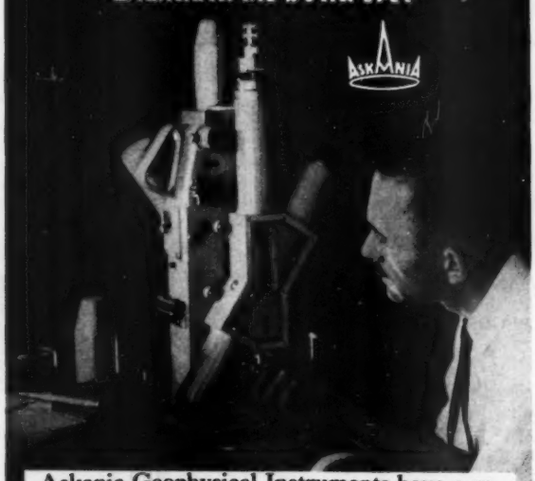

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Summary of Operations, All Fields, December

SUMMARY OF ALL FIELDS

Wells Completed

	Comp.	Prod.	Dry	Gas
Penna Grade	428	1,658	40	103
Central Ohio	112	622	40	34
Indiana	6	5	2	3
Illinois	78	11,881	33	0
Michigan	61	12,501	16	2
Eastern Kentucky	33	230	3	19
Western Kentucky	34	352	15	6
Kansas	212	86,234	68	15
Oklahoma	219	31,950	68	16
N. Central Texas	173	30,892	71	1
West Texas	248	150,369	45	1
Texas Panhandle	90	33,608	4	13
East Texas	250	12,339	8	0
E. Central Texas	43	8,671	7	2
E. Texas (border)	13	4,175	1	0
Gulf Coast Texas	135	49,652	27	2
Southwest Texas	156	12,489	37	7
North Louisiana	57	14,245	15	13
Gulf Coast, La.	32	8,367	14	1
Arkansas	17	14,590	3	0
Mississippi	4	0	4	0
Florida	1	0	1	0
Montana	7	234	3	0
Nebraska	1	0	1	0
Wyoming	12	1,732	4	1
Colorado	4	0	4	0
New Mexico	52	29,340	1	2
Total Dec.	2,478	516,136	535	235
Total Nov.	2,556	603,605	463	286
Difference	78	87,469	71	51

Rigs and Wells Drilling

	Rigs	Drlg.	Ttl.
Penna. Grade field	76	375	451
Central Ohio	42	122	164
Indiana	0	39	39
Illinois	22	94	116
Michigan	41	152	193
Eastern Kentucky	8	36	44
Western Kentucky	0	40	40
Kansas	47	302	349
Oklahoma	54	316	370
North Central Texas	85	242	327
West Texas	83	366	449
Texas Panhandle	28	152	180
East Texas	40	102	142
East Central Texas	9	60	69
East Texas (border)	10	12	22
Gulf Coast Texas	33	130	163
Southwest Texas	43	180	223
North Louisiana	24	72	96
Gulf Coast Louisiana	5	99	104
Arkansas	16	29	45
Mississippi	10	7	17
Florida	1	1	2
Alabama	1	1	2
Montana	1	45	46
Wyoming	6	81	87
Colorado	0	34	34
Utah	1	7	8
New Mexico	10	150	160
Nebraska	0	6	6
Total Dec.	696	3,252	3,948
Total Nov.	702	3,576	4,278
Difference	6	324	330

OKLAHOMA

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Atoka	0	0	0	0	1	1
Beckham	1	0	0	0	2	2
Bryan	0	0	0	0	1	1
Caddo	3	678	1	1	11	12
Carter	19	332	4	3	15	18
Choctaw	0	0	0	0	2	2
Cleveland	1	0	1	0	3	3
Coal	4	1,044	2	1	4	5
Comanche	0	0	0	1	1	2
Cotton	1	0	1	0	1	1
Creek	13	170	7	5	40	45
Garfield	0	0	0	0	1	1
Garvin	8	824	2	0	3	3
Grady	1	0	0	1	5	6
Grant	0	0	0	0	3	3
Greer	0	0	0	0	1	1
Hughes	4	38	1	0	8	8
Jackson	0	0	0	0	5	5
Jefferson	16	962	1	1	8	9
Johnston	0	0	0	0	2	2
Kay	5	715	2	2	4	6
Kiowa	0	0	0	0	2	2
Latimer	1	0	1	0	0	0
Lincoln	9	2,253	1	0	8	8
Logan	6	4,158	1	1	4	5
Major	0	0	0	1	0	1
Marshall	0	0	0	0	1	1
Murray	1	0	1	0	2	2
Muskogee	1	5	0	2	6	8
Noble	4	7,221	0	1	4	5
Okfuskee	1	15	0	2	4	6
Oklahoma	2	860	0	4	13	17
Okmulgee	5	250	0	3	37	40
Osage	23	611	10	6	22	28
Payne	2	0	1	0	2	2
Pittsburg	2	0	2	0	2	2
Pontotoc	20	7,042	6	8	26	34
Pottawat'mie	7	382	1	4	13	17
Pushmataha	1	0	1	0	0	0
Seminole	23	3,358	7	4	24	28
Stephens	11	620	2	1	10	11
Texas	1	0	0	0	1	1
Tillman	1	234	0	0	2	2
Tulsa	20	138	11	1	8	9
Washita	1	0	1	0	1	1
Wagoner	1	40	0	1	3	4
Ttl. Dec.	219	31,950	68	54	316	370
Ttl. Nov.	153	30,021	45	51	371	422
Difference	66	1,929	23	3	55	52

Gas well completions: Beckham 1, Carter 2, Creek 2, Hughes 1, Grady 1, Payne 1, Okmulgee 2, Osage 1, Seminole 1, Texas 1, Tulsa 3. Total 16.

KANSAS

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Barber	2	150	1	1	7	8
Barton	32	22,015	4	3	44	47
Butler	4	394	3	4	13	17
Chautauqua	7	137	3	0	6	6
Clark	0	0	0	0	2	2
Coffey	1	10	0	0	0	0
Cowley	7	682	3	1	16	17
Elk	1	0	1	0	1	1
Ellis	19	14,682	8	6	23	29
Ellsworth	2	805	0	0	6	6
Ford	1	0	1	0	0	0
Grant	7	0	0	0	6	6
Greenwood	7	140	3	1	5	6
Harvey	6	1,791	0	0	4	4
Jackson	0	0	0	0	1	1
Jewell	0	0	0	0	1	1
Lane	0	0	0	0	1	1
Marion	1	45	0	1	4	5
McPherson	12	2,825	3	4	11	15
Meade	0	0	0	0	1	1
Ness	0	0	0	1	6	7
Pawnee	2	284	1	0	2	2
Phillips	0	0	0	0	1	1
Pratt	1	0	1	0	3	3
Reno	7	316	4	2	10	12
Rice	18	11,946	6	6	24	30
Rooks	6	1,240	5	2	9	11
Rush	1	0	1	0	4	4
Russell	30	22,695	5	9	46	55
Scott	1	143	0	0	0	0
Sedgwick	4	1,612	1	0	8	8
Stafford	13	3,745	8	1	15	16
Stevens	6	0	0	2	4	6
Sumner	3	366	2	0	9	9
Trego	1	0	1	1	1	2
Woodson	10	211	3	2	8	10
Ttl. Dec.	212	86,234	68	47	302	349
Ttl. Nov.	237	152,082	53	63	329	392
Difference	25	65,848	15	16	27	43

Gas well completions: Barton 1, Reno 1, Stevens 6, Grant 7. Total 15.

EAST CENTRAL AND EAST TEXAS

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Anderson	2	157	0	1	9	10
Angelina	1	0	1	1	1	2
Bowie	0	0	0	0	2	2
Cherokee	0	0	0	1	2	3
Dallas	0	0	0	0	1	1
Delta	0	0	0	0	1	1
Falls	0	0	0	2	0	2
Fanning	0	0	0	0	2	2
Franklin	15	3,814	1	0	10	10
Freestone	0	0	0	0	3	3
Gregg	131	7,157	1	20	51	71
Henderson	3	163	0	1	3	4
Hill	0	0	0	1	1	2
Hopkins	1	0	1	0	2	2
Houston	0	0	0	0	2	2
Hunt	1	0	1	0	0	0
Lamar	1	0	1	0	2	2
Leon	0	0	0	0	1	1
Limestone	1	0	1	0	2	2
Madison	0	0	0	0	3	3
Navarro	1	0	1	0	2	2
Rockwell	0	0	0	0	1	1
Rusk	81	3,687	5	13	37	50
Smith	6	207	1	0	4	4
Titus	16	4,522	0	1	9	10
Trinity	0	0	0	2	1	3
Upshur	32	1,288	1	6	8	14
Wood	0	0	0	0	1	1
Van Zandt	1	15	0	0	1	1
Ttl. Dec.	293	21,010	15	49	162	211
Ttl. Nov.	240	19,041	7	59	150	209
Difference	53	1,969	8	10	12	2

Gas wells completed: Anderson 1, Henderson 1. Total 2.

WEST TEXAS

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Andrews	4	1,014	2	4	10	14
Bailey	0	0	0	0	1	1
Borden	0	0	0	0	1	1
Brewster	0	0	0	0	2	2
Cochran	1	0	1	0	3	3
Coke	13	6,473	2	6	9	15
Crockett	0	0	0	0	5	5
Culberson	0	0	0	0	2	2
Dawson	1	10	0	0	1	1
Ector	60	61,047	0	13	84	97
Edwards	0	0	0	1	1	2
El Paso	0	0	0	0	1	1
Fisher	10	4,781	3	3	11	14
Gaines	7	2,150	3	3	10	13
Garza	0	0	0	0	1	1
Glassock	1	539	0	1	1	2
Hockley	0	0	0	0	2	2
Howard	8	4,393	0	13	32	45
Hudspeth	0	0	0	0	2	2
Irion	0	0	0	0	1	1
Jeff Davis	0	0	0	0	1	1
Jones	22	12,734	8	3	33	36
Kent	1	0	1	0	0	0
Lynn	0	0	0	1	0	1
Loving	1	605	0	1	6	7
Martin	1	0	1	0	1	1
McCulloch	1	0	1	0	0	0
Nolan	0	0	0	0	1	1
Mitchell	0	0	0	1	1	2
Menard	0	0	0	0	2	2
Pecos	14	487	6	5	24	29
Presidio	1	0	1	0	1	1
Reagan	1	0	1	0	0	0
Reeves	0	0	0	0	3	3
Runnels	1	0	1	0	2	2
Schleicher	0	0	0	0	2	2
Scurry	0	0	0	0	3	3
Sterling	1	0	1	0	1	1
Stonewall	0	0	0	1	0	1
Sutton	0	0	0	0	1	1
Taylor	1	0	1	0	3	3
Terrell	0	0	0	0	1	1
Terry	0	0	0	0	1	1
Tom Green	1	0	1	0	2	2
Upton	26	13,681	1	5	23	28
Ward	32	18,721	6	8	31	39
Winkler	34	23,073	0	9	27	36
Yoakum	5	661	4	4	15	19
Ttl. Dec.	248	150,369	45	83	366	449
Ttl. Nov.	194	153,297	22	86	385	471
Difference	54	2,928	23	3	19	22

Gas wells completed: Winkler, 1.

CENTRAL AND NORTH TEXAS

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Archer	25	2,330	14	5	11	16
Baylor	1	0	1	0	1	1
Brown	2	15	0	0	6	6
Callahan	0	0	0	2	11	13
Clay	6	422	2	2	7	9
Coleman	5	100	4	2	5	7
Comanche	0	0	0	0	2	2
Cooke	14	256	4	1	6	7
Denton	0	0	0	0	5	5
Eastland	1	15	0	0	7	7
Erath	1	15	0	0	2	2
Fannin	0	0	0	0	1	1
Foard	0	0	0	1	1	2
Grayson	2	0	2	1	3	4
Jack	32	5,786	9	7	24	31
Johnson	0	0	0	0	1	1
McCulloch	0	0	0	0	2	2
Mills	0	0	0	0	1	1
Montague	3	40	1	2	5	7
Palo Pinto	0	0	0	0	7	7
Parker	0	0	0	1	0	1
Shackelford	10	175	7	3	14	17
Stephens	0	0	0	0	5	5
Thr'morton	0	0	0	0	4	4
Wichita	36	15,875	8	49	66	115
Wilbarger	5	1,075	1	2	13	15
Wise	1	0	1	0	2	2
Young	29	4,788	17	7	30	37
Ttl. Dec.	173	30,892	71	85	242	327
Ttl. Nov.	175	23,361	71	53	223	276
Difference	2	7,531	0	32	19	51

Gas wells completed: Brown 1.

TEXAS PANHANDLE

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Armstrong	0	0	0	0	1	1
Briscoe	0	0	0	0	1	1
Carson	10	1,967	0	1	11	12
Cottle	0	0	0	0	1	1
Collingsworth	0	0	0	0	1	1
Dallam	0	0	0	0	1	1
Deaf Smith	0	0	0	0	1	1
Dickens	0	0	0	0	2	2
Floyd	0	0	0	0	1	1
Gray	30	14,272	1	12	47	59
Hall	0	0	0	0	1	1
Hansford	0	0	0	0	1	1
Hartley	1	0	1	0	1	1
Hutchinson	39	17,369	0	13	53	66
King	1	0	1	0	0	0
Lamb	0	0	0	0	1	1
Moore	8	0	0	1	9	10
Ochiltree	0	0	0	0	1	1
Potter	0	0	0	0	1	1
Roberts	0	0	0	0	2	2
Sherman	0	0	0	0	1	1
Wheeler	1	0	1	1	14	15
Ttl. Dec.	90	33,608	4	28	152	180
Ttl. Nov.	79	33,756	3	32	176	208
Difference	11	148	1	4	24	28

Gas wells completed: Carson 3, Hutchinson 2, Moore 8. Total 13.

SOUTHWEST TEXAS

Summary of Field Operations

Field—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Agua Dulce	0	0	0	0	3	3
Alta Mesa	0	0	0	0	2	2
Armagosa	0	0	0	1	0	1
Alta Verde	0	0	0	0	2	2
Aviator	1	0	1	0	0	0
Batesville	0	0	0	0	1	1
Benavides	13	1,342	0	3	12	15
Branyon	5	677	1	0	1	1
Bruni	1	50	0	0	0	0
Buchanan	3	24	2	0	3	3
Burdette Wells	2	73	1	0	3	3
Callihan	0	0	0	0	2	2
Charamousca	2	220	0	0	0	0
C. Driscoll	0	0	0	1	0	1
Cole	0	0	0	1	0	1
Comitas	0	0	0	1	0	1
Dale	4	114	0	0	3	3
Darst Creek	2	190	0	0	3	3
Dunlap	0	0	0	0	1	1
E. Premont	1	948	0	1	0	1
Escobas	1	40	0	0	2	2
Ezzell	18	2,337	0	3	9	12
Flour Bluff	7	700	0	0	5	5
Gas Ridge	0	0	0	0	1	1
Henne-Winch-Farriss	1	0	1	0	0	0
Hoffman	2	180	0	1	2	3
Jacob	4	72	1	0	1	1
Killam	9	352	0	2	3	5
Labbe	1	60	0	1	1	2
LaBlanca	0	0	0	0	1	1
La Sal Vieja	1	0	1	0	0	0
Lost Mule	1	75	0	0	1	1
Los Olmos	1	0	1	0	0	0
Luby	2	150	0	0	2	2
Luling	4	370	0	2	3	5
Lundell	2	84	0	0	1	1
Lytton Spgs.	0	0	0	0	1	1
McCampbell	4	802	1	4	11	15
Mercedes	0	0	0	0	1	1
Normanna	1	27	0	0	1	1
N. Pettus	1	40	0	0	2	2
Oilton	8	930	0	0	6	6
O'hern	0	0	0	0	1	1
Peters	1	0	1	0	1	1
Pearsall	0	0	0	0	2	2
Piedra Lumbre	1	108	0	0	1	1
Plymouth	0	0	0	0	3	3
Premont	1	50	0	0	2	2
Ricaby	1	0	1	0	1	1
Rich'd. King	1	0	0	1	0	1
Rio Grande City	0	0	0	0	1	1
Salt Flats	5	177	0	2	5	7
Samfordyce	0	0	0	0	1	1
Saxet	12	1,300	0	5	11	16
Seven Sisters	1	75	0	0	1	1
S. Burnell	3	531	0	1	2	3
Stratton	0	0	0	0	1	1
Sweden	1	124	0	0	1	1
Taft	2	267	0	1	0	1
Taylor	0	0	0	0	1	1
Thomas-Lockhart	1	0	1	0	0	0
Von Ormy	0	0	0	0	1	1
West Tuleta	0	0	0	0	1	1
Zoboroski	0	0	0	0	1	1
Miscellaneous	24	0	24	12	52	64
Ttl. Dec.	156	12,489	37	43	180	223
Ttl. Nov.	238	21,489	54	42	217	259
Difference	82	9,000	24	1	37	36

Gas wells completed: Ezzell 4, Killam 1, Oilton 1, Richard King 1. Total 7.

TEXAS GULF COAST

Summary of Field Operations

Field—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Amelia	6	2,397	0	2	4	6
Anahuac	7	4,238	0	1	3	4
Bay City	1	395	0	0	1	1
Barbers Hill	0	0	0	0	2	2
Big Hill	1	0	1	0	1	1
Boling	0	0	0	0	1	1
Buckeye	0	0	0	0	1	1
Clay Creek	0	0	0	0	1	1
Clinton	0	0	0	0	1	1
Cleveland	0	0	0	0	1	1
Cotton Lake	0	0	0	0	1	1
Dam'n Mound	1	26	0	0	0	0
Danbury	0	0	0	0	2	2
Dickinson	7	3,467	1	0	7	7
Esperson	1	214	0	0	1	1
Fairbanks	0	0	0	0	1	1
Fannett	0	0	0	0	1	1
Five Corners	1	178	0	0	0	0
Fox	0	0	0	0	2	2
Friendswood	4	1,223	2	0	2	2
Garwood	0	0	0	1	0	1
Greta	0	0	0	0	2	2
Hardin	4	1,903	0	2	8	10
Hankamer	1	168	0	0	0	0
Hastings	39	20,873	2	9	11	20
Heyser	7	1,518	0	4	7	11
High Island	2	101	0	1	1	2
Hitchcock	1	474	0	0	1	1
Hull	0	0	0	0	2	2
Katy	0	0	0	0	1	1
Keeran	0	0	0	0	1	1
Labelle	1	0	1	0	0	0
Louise	1	177	0	0	1	1
Lockridge	2	10	0	0	3	3
Magnet	2	264	0	0	2	2
Manvel	1	455	0	0	1	1
McFaddin	1	144	0	1	0	1
Markham	1	158	0	0	0	0
Nome	2	0	2	0	2	2
North Cheek	0	0	0	0	1	1
Old Ocean	0	0	0	0	2	2
Orchard	0	0	0	0	2	2
Orange	1	0	1	1	2	3
Palacios	1	0	1	1	0	1
Pickett Ridge	1	48	0	0	1	1
Pierce Junction	1	579	0	0	1	1
Placedo	0	0	0	0	2	2
Port Neches	1	557	0	0	0	0
Refugio	0	0	0	2	4	6
Sandy Point	1	0	1	0	0	0
Silsbee	2	932	0	0	2	2
Seabreeze	1	829	0	1	1	2
Segno	1	240	0	0	2	2
South Call	1	0	1	0	0	0
S. Houston	0	0	0	0	1	1
Spindletop	0	0	0	1	2	3
Spurger	0	0	0	0	1	1
Telfener	1	0	1	0	0	0
Tomball	2	170	0	0	3	3
Turtle Bay	3	1,720	0	0	2	2
Quintana-O'Connor	5	4,272	0	3	5	8
Van Vleck	0	0	0	0	1	1
W. Columbia	3	1,457	0	0	2	2
Withers	3	465	0	0	1	1
Miscell'neous	13	0	13	3	16	19
Ttl. Dec.	135	49,652	27	33	130	163
Ttl. Nov.	169	70,067	22	38	164	202
Difference	34	20,415	5	5	34	39

Gas wells completed: Amelia 1, Lockridge 1. Total 2.

COASTAL LOUISIANA

Summary of Field Operations

Field—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Anse LaButte	2	320	0	0	1	1
Bayou Blue	1	0	1	0	1	1
Bay St. Elaine	0	0	0	0	2	2
Bayou Cocotriz	1	932	0	0	1	1

Bayou Des Allemands	0	0	0	0	1	1
Big Lake	0	0	0	0	2	2
Black Bayou	0	0	0	0	1	1
Bosco	0	0	0	0	1	1
Caillou Island	0	0	0	0	1	1
Cameron Meadows	0	0	0	0	3	3
Charenton	1	0	1	0	1	1
Cheneyville	0	0	0	0	1	1
Choctaw	0	0	0	0	2	2
Darrow	1	672	0	0	1	1
Dog Lake	0	0	0	0	1	1
Four Isle	0	0	0	0	1	1
Gillis	0	0	0	0	1	1
Gard'n Island	1	364	0	0	1	1
Hackberry	2	476	1	0	6	6
Iowa	0	0	0	0	1	1
Jeanerette	0	0	0	0	2	2
Jennings	5	1,515	0	2	13	15
Lafitte	1	1,286	0	0	2	2
L. Hermit'ge	0	0	0	0	1	1
Lake Long	0	0	0	0	1	1
Lake Pelto	1	909	0	0	1	1
Lirette	0	0	0	0	1	1
Lockport	0	0	0	0	1	1
N. Cowley	1	0	1	0	2	2
New Iberia	0	0	0	0	5	5
Potash	6	0	6	0	2	2
Quarantine Bay	1	845	0	0	0	0
Roanoke	0	0	0	0	2	2
South Elton.	0	0	0	0	1	1
S. Jennings	0	0	0	0	1	1
Sorrento	0	0	0	0	1	1
Starks	1	0	0	1	0	1
Sulphur	1	208	0	0	2	2
Tepetate	0	0	0	0	1	1
Valentine	1	240	0	1	2	3
Venice	1	600	0	0	1	1
Villa Platte	0	0	0	0	1	1
Vinton	0	0	0	0	3	3
White Castle	0	0	0	0	2	2
Miscellaneous	4	0	4	1	21	22
Total Dec.	32	8,367	14	5	99	104
Total Nov.	47	12,571	21	16	90	106
Difference	15	4,204	7	11	9	2

Gas wells completed: Starks 1.

NORTH LOUISIANA

Summary of Field Operations

Parish—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Bienville	1	0	0	1	1	2
Bossier	0	0	0	1	3	4
Caddo-Rodessa	11	3,635	0	1	11	12
Caddo-other	12	300	5	3	11	14
Catahoula	0	0	0	1	0	1
Claiborne	9	7,495	0	2	12	14
Concordia	0	0	0	1	0	1
De Soto	0	0	0	2	2	4
Franklin	1	0	1	0	0	0
Jackson	1	0	1	0	0	0
LaSalle	2	45	0	0	1	1
Lincoln	3	2,110	0	1	4	5
Morehouse	0	0	0	2	2	4
Ouachita	1	0	0	2	2	4
Red River	1	240	0	1	2	3
Sabine	5	0	5	1	1	2
Tensas	1	0	1	1	0	1
Union	6	0	0	2	5	7
Webster	3	420	1	2	15	17
Total Dec.	57	14,245	15	24	72	96
Total Nov.	57	16,940	7	29	76	105
Difference	0	2,695	7	5	4	9

Gas wells completed: Bienville 1—5,000,000 feet; Caddo-Rodessa, 3—11,550,000 feet; Caddo-other, 1—14,400,000 feet; Claiborne, 1—2,000,000 feet; Ouachita, 1—2,000,000 feet; Union, 6—44,500,000 feet. Total, 13—79,450,000 feet.

ARKANSAS

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Calhoun	0	0	0	1	0	1
Clark	1	0	1	0	0	0
Columbia	2	455	1	1	1	2
Crittendon	0	0	0	1	1	2
Dallas	0	0	0	0	1	1
Hempstead	0	0	0	2	0	2
Lincoln	0	0	0	1	0	1
Lonoke	0	0	0	2	0	2
Miller-Rodessa	8	7,090	0	3	10	13
Nevada	2	150	1	3	0	3
Ouachita	0	0	0	1	1	2
Pulaski	0	0	0	0	1	1
Saline	0	0	0	1	0	1
Union	4	6,895	0	0	14	14
Total Dec.	17	14,590	3	16	29	45
Total Nov.	21	8,350	4	23	38	61
Difference	4	6,240	1	7	9	16

Gas wells completed: None.

ALABAMA

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Houston	0	0	0	1	0	1
Mobile	0	0	0	0	1	1
Total Dec.	0	0	0	1	1	2
Total Nov.	1	0	1	0	2	2
Difference	1	0	1	1	1	0

FLORIDA

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Lake	1	0	1	1	0	1
Nassau	0	0	0	0	1	1
Total Dec.	1	0	1	1	1	2
Total Nov.	0	0	0	0	4	4
Difference	1	0	1	1	3	2

MISSISSIPPI

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Boliver	1	0	1	0	0	0
Calhoun	0	0	0	1	0	1
Claiborne	0	0	0	1	1	2
George	0	0	0	1	0	1
Harrison	0	0	0	1	0	1
Hancock	0	0	0	1	0	1
Hinds	0	0	0	2	1	3
Jones	1	0	1	0	0	0
Kemper	0	0	0	1	0	1
Lamar	1	0	1	1	1	2
Perry	0	0	0	0	1	1
Pike	0	0	0	1	0	1
Simpson	0	0	0	0	1	1
Washington	1	0	1	0	0	0
Wilkinson	0	0	0	0	1	1
Yalobusha	0	0	0	0	1	1
Total Dec.	4	0	4	10	7	17
Total Nov.	1	0	1	3	16	19
Difference	3	0	3	7	9	2

EAST TEXAS (Border Counties)

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Bowie	0	0	0	1	1	2
Cass-Rodessa	6	1,365	0	3	2	5
Cass-other	0	0	0	0	1	1
Harrison	0	0	0	1	1	2
Marion-Rodessa	6	2,810	0	1	5	6
Panola	1	0	1	2	2	4
Shelby	0	0	0	2	0	2
Total Dec.	13	4,175	1	10	12	22
Total Nov.	18	5,990	0	3	25	28
Difference	5	1,815	1	7	13	6

Gas wells completed: None.

ROCKY MOUNTAIN AREA

New Mexico

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Bernalillo	0	0	0	0	1	1
McKinley	0	0	0	0	6	6
San Juan	1	26	0	0	4	4
San Miguel	0	0	0	0	3	3
Socorro	0	0	0	0	1	1
Torrance	0	0	0	0	1	1
Valencia	0	0	0	0	3	3
Lea	44	27,289	1	8	89	97
Eddy	7	1,925	0	2	33	25
Chavez	0	0	0	0	3	3
Curry	0	0	0	0	1	1
DeBaca	0	0	0	0	1	1
Otero	0	0	0	0	3	3
Roosevelt	0	0	0	0	1	1
Total Dec.	52	29,340	1	10	150	160
Total Nov.	51	21,306	7	11	159	170
Difference	8	8,034	6	1	9	10

Gas wells completed: Lea 2.

Wyoming

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Albany	3	480	2	0	2	2
Big Horn	1	30	0	0	4	4
Carbon	0	0	0	1	8	9
Converse	1	0	1	1	8	9
Fremont	0	0	0	0	6	6
Hot Springs	0	0	0	1	4	5
Lincoln	0	0	0	0	4	4
Natrona	0	0	0	0	9	9
Niobrara	4	1,139	0	2	10	12
Park	0	0	0	0	3	3
Sweetwater	1	0	1	0	9	9
Sublet	1	33	0	0	0	0
Uinta	0	0	0	0	3	3
Weston	1	50	0	1	8	9
Miscellaneous	0	0	0	0	3	3
Ttl. Dec.	12	1,732	4	6	81	87
Ttl. Nov.	13	2,607	3	14	66	80
Difference	1	875	1	8	5	7

Gas wells completed: Niobrara, 1.

Colorado

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Adams	0	0	0	0	2	2
Archuleta	1	0	1	0	5	5
Boulder	0	0	0	0	1	1
Cheyenne	0	0	0	0	1	1
Huerfano	0	0	0	0	2	2
La Plata	0	0	0	0	3	3
Larimer	1	0	1	0	1	1
Lincoln	1	0	1	0	1	1
Mesa	0	0	0	0	2	2
Moffat	1	0	1	0	1	1
Park	0	0	0	0	3	3
Rio Blanco	0	0	0	0	2	2
Routt	0	0	0	0	2	2
Miscellaneous	0	0	0	0	8	8
Ttl. Dec.	4	0	4	0	34	34
Ttl. Nov.	2	0	2	1	32	33
Difference	2	0	2	1	2	1

No gas wells completed.

Montana

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Big Horn	0	0	0	0	3	3
Carbon	0	0	0	0	5	5
Fergus	1	0	1	0	6	6
Glacier	1	90	0	0	3	3
Petroleum	0	0	0	0	2	2
Pondera	0	0	0	1	1	2
Roosevelt	1	0	1	0	0	0
Toole	4	144	1	0	12	12
Yellowstone	0	0	0	0	3	3
Miscellaneous	0	0	0	0	10	10
Ttl. Dec.	7	234	3	1	45	46
Ttl. Nov.	23	632	8	2	46	48
Difference	16	398	5	1	1	2

No gas wells completed.

Utah

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Ttl. Dec.	0	0	0	1	7	8
Ttl. Nov.	1	0	0	0	7	7
Difference	1	0	0	1	0	1

Nebraska

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Sioux	1	0	1	0	0	0
Miscellaneous	0	0	0	0	6	6
Ttl. Dec.	1	0	1	0	6	6
Ttl. Nov.	0	0	0	0	7	7
Difference	1	0	1	0	1	1

EASTERN KENTUCKY

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Knott	7	0	0	4	7	11
Pike	1	0	0	1	2	3
Floyd	9	25	0	1	13	14
Powell	1	5	0	0	1	1
Martin	3	6	1	2	8	10
Johnson	2	0	1	0	0	0
Magoffin	3	11	1	0	0	0
Perry	0	0	0	0	1	1
Lawrence	1	0	0	0	1	1
Carter	1	0	0	0	0	0
Lee	5	183	0	0	3	3
Ttl. Dec.	33	230	3	8	36	44
Ttl. Nov.	39	833	2	13	39	52
Difference	6	603	1	5	3	8

Gas wells completed: Knott 7, Pike 1, Floyd 8, Johnson 1, Lawrence 1, Carter 1. Total 19.

WESTERN KENTUCKY

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Breckinridge	2	0	1	0	4	4
Butler	1	20	0	0	0	0
Caldwell	0	0	0	0	1	1
Daviess	3	25	2	0	5	5
Grayson	1	0	0	0	1	1
Hancock	5	65	2	0	9	9
Henderson	1	10	0	0	2	2
McLean	8	135	4	0	5	5
Ohio	12	97	5	0	11	11
Union	0	0	0	0	1	1
Webster	1	0	1	0	1	1
Ttl. Dec.	34	352	15	0	40	40
Ttl. Nov.	55	882	21	0	47	47
Difference	21	530	6	0	7	7

Gas wells completed: Breckinridge, 1; Grayson, 1; Hancock, 1; McLean, 1; Ohio, 2; Total 6.

MICHIGAN

Summary of Field Operations

Field—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Adams	0	0	0	1	3	4
Bentley	2	342	0	2	1	3
Broomfield	0	0	0	2	0	2
Buckeye	12	3,465	0	3	21	24
Clayton	2	65	0	2	8	10
Crystal	1	0	1	0	1	1
Deerfield	0	0	0	1	0	1
Leaton	0	0	0	0	1	1
Mecosta	1	0	1	0	0	0
New Haven	0	0	0	1	0	1
Porter-Yost	2	63	0	1	2	3
Ravenna	1	0	0	0	0	0
Salem	5	1,375	1	3	6	9
Secord	0	0	0	0	3	3
Sherman	3	1,450	0	2	5	7
Trowbridge	2	0	2	0	1	1
W. Branch	3	50	1	2	12	14
Winegars	16	5,664	1	6	23	29
Wisner	1	24	0	0	0	0
Wildcats	10	12	9	15	65	80
Total Dec.	61	12,501	16	41	152	193
Total Nov.	69	16,295	23	31	158	189
Difference	8	3,794	7	10	6	4

Gas wells completed: Clayton 1, Ravenna 1. Total 2.

ILLINOIS

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Bond	2	0	2	0	2	2
Bureau	0	0	0	0	1	1
Christian	3	0	3	0	0	0
Clark	1	0	1	0	1	1
Clay	15	1,604	4	2	5	7
Clinton	4	90	3	2	2	4
Coles	0	0	0	0	3	3
Crawford	1	25	0	0	0	0
Cumberland	0	0	0	1	1	2
DeKalb	0	0	0	0	2	2
DeWitt	0	0	0	1	0	1
Edgar	0	0	0	1	0	1
Edwards	0	0	0	0	2	2
Effingham	1	0	1	1	0	1
Fayette	2	0	2	2	4	6
Franklin	0	0	0	0	2	2
Greene	0	0	0	0	1	1
Hamilton	0	0	0	0	1	1
Hardin	0	0	0	0	1	1
Iriquois	0	0	0	0	1	1
Jasper	0	0	0	0	2	2
Jefferson	0	0	0	1	3	4
Lawrence	2	0	2	0	0	0
Madison	0	0	0	0	1	1
Marion	15	432	6	0	12	12
Massac	0	0	0	0	1	1
Montgomery	0	0	0	0	1	1
Pope	0	0	0	0	1	1
Randolph	0	0	0	0	1	1
Richland	24	8,780	3	8	27	35
Rock Island	0	0	0	0	1	1
Saline	0	0	0	0	2	2
Shelby	1	0	1	0	1	1
Vermilion	0	0	0	0	1	1
Wabash	0	0	0	0	2	2
Washington	0	0	0	1	0	1
Wayne	6	950	4	2	6	8
White	1	0	1	0	1	1
Will	0	0	0	0	1	1
Williamson	0	0	0	0	1	1
Ttl. Dec.	78	11,881	33	22	94	116
Ttl. Nov.	61	11,928	19	20	132	152
Difference	17	47	15	2	38	36

Gas wells completed: 0.

OHIO

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Ashland	1	0	1	1	3	4
Ashtabula	3	0	2	0	0	0
Athens	6	0	4	5	5	10
Belmont	8	6	4	2	3	5
Coshocton	1	10	0	0	1	1
Cuyahoga	1	0	0	0	3	3
Fairfield	2	0	0	3	0	3
Gallia	0	0	0	1	0	1
Green	0	0	0	0	1	1
Guernsey	4	0	3	2	4	6
Hocking	0	0	0	1	2	3
Holmes	0	0	0	0	1	1
Huron	1	0	0	0	2	2
Knox	5	111	1	3	9	12
Lawrence	0	0	0	1	1	2
Licking	6	24	3	6	8	14
Lorain	4	0	3	2	2	4
Medina	21	136	5	0	1	1
Meigs	4	0	3	3	6	9
Monroe	2	0	1	0	10	10
Morgan	5	1	1	1	4	5
Muskingum	5	24	1	2	8	10
Noble	2	0	0	2	4	6
Perry	5	105	1	0	6	6
Putnam	2	55	0	0	0	0
Richland	0	0	0	0	1	1
Seneca	2	30	1	0	2	2
Stark	5	0	1	1	8	9
Summit	3	0	2	0	4	4
Tuscarawas	3	0	0	0	8	8
Vinton	1	0	0	0	0	0
Washington	10	20	3	5	13	18
Wayne	0	0	0	0	1	1
Wood	0	0	0	1	1	2
Ttl. Dec.	112	622	40	42	122	164
Ttl. Nov.	97	884	33	40	121	161
Difference	15	262	7	2	1	3

Gas wells completed: Ashtabula 1, Athens 2, Belmont 2, Fairfield 2, Guernsey 1, Huron 1, Knox 2, Lorain 1, Meigs 1, Monroe 1, Morgan 3, Muskingum 1, Noble 2, Perry 2, Stark 4, Summit 1, Tuscarawas 3, Vinton 1, Washington 2, Cuyahoga 1. Total, 34.

INDIANA

Summary of Field Operations

County—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Crawford	0	0	0	0	1	1
Daviess	0	0	0	0	3	3
Dearborn	0	0	0	0	1	1
DeKalb	0	0	0	0	1	1
Gibson	1	0	1	0	2	2
Hamilton	0	0	0	0	1	1
Hancock	1	0	0	0	2	2
Harrison	0	0	0	0	1	1
Huntington	0	0	0	0	1	1
Jay	0	0	0	0	1	1
Jennings	0	0	0	0	1	1
Knox	0	0	0	0	1	1
Lagrange	0	0	0	0	1	1
Perry	1	5	0	0	5	5
Pike	0	0	0	0	4	4
Porter	0	0	0	0	1	1
Posey	0	0	0	0	2	2
Rush	0	0	0	0	1	1
Spencer	1	0	1	0	2	2
Sullivan	2	0	0	0	3	3
Vandenburgh	0	0	0	0	2	2
Vigo	0	0	0	0	1	1
Wabash	0	0	0	0	1	1
Ttl. Dec.	6	5	2	0	39	39
Ttl. Nov.	24	95	7	0	33	33
Difference	18	90	5	0	6	6

Gas wells completed: Hancock, 1; Sullivan, 2; total 3.

EASTERN FIELDS

Summary of Field Operations

Field—	Comp.	Prod.	Dry	Rgs.	Dlg.	Ttl.
Bradford	164	1,147	0	11	60	71
Allegany	60	46	0	4	37	41
Venango-Clarion	21	25	0	3	9	12
Butler-Armstrong	7	13	1	5	9	14
N. Y. Penna. Gas	9	0	1	1	20	21
S.W. Penna.	26	220	4	16	43	49
S.E. Ohio	42	96	15	11	44	55
W. Virginia	99	111	19	35	153	188
Ttl. Dec.	428	1,658	40	76	375	451
Ttl. Nov.	491	1,172	27	73	451	524
Difference	63	486	13	3	76	73

Gas wells completed: Venango-Clarion 2, Butler-Armstrong 3, N. Y.-Penna. Gas 8, S.W. Penna 15, West Virginia 64. Total 103.

WILDCAT OPERATIONS

CALIFORNIA

IMPORTANT WELLS AND NORTHERN CALIFORNIA WILDCATS

Company, well and location:	S.T.R.	Depth	Status
Wilshire Oil, No. 1 Gaviota, Santa Barbara	35- 5-33	922	sd. sh. drlg.
Hancock-Bush, No. 2-C.L. Santa Maria, Santa Barbara	30-10-33	4,353	redrlg. 4,312
Hancock-Bush, No. 3-H Santa Maria, Santa Barbara	30-10-33	4,861	sd. sh. drlg.
Ohio Oil, No. 3-M Santa Maria, Santa Barbara	21-10-34	4,096	sd. sh. drlg.
Dugan Oil, No. 1 Yelkin, Santa Maria, Santa Barbara	27-10-34	4,683	sd. sh. drlg.
Edco Oil, No. 1 Santa Maria, Santa Barbara	27-10-34	1,998	sd. sh. drlg.
Pet. Prop., Inc., No. 1-R Santa Maria, Santa Barbara	19-10-33	2,200	pump. 100 b.d.
Cal. Lands, Inc., No. 2 Santa Maria, Santa Barbara	26-10-34	3,984	hd. sh. drlg.
Moore, E. H., No. 13-E Sugar, S. Maria, Santa Barbara	24-10-35	1,693	sd. sh. drlg.
Moore, E. H., No. 10-L Sugar, S. Maria, Santa Barbara	30-10-34	6,350	sd. sh. drlg.
Moore, E. H., No. 1-G Sugar, S. Maria, Santa Barbara	19-10-34	2,584	sd. sh. drlg.
Pet. Sec., No. 1-R Santa Maria, Santa Barbara	35-10-34	5,349	sd. sh. drlg.
Signal Oil, No. 1 Romalho, S. Maria, Santa Barbara	27-10-34	4,475	sd. sh. drlg.
Union Oil, No. 1-A Santa Maria, Santa Barbara	22-10-34	4,361	sd. sh. drlg.
Union Oil, No. 2 Bradley, Santa Maria, Santa Barbara	25-10-34	5,017	flow. 410 b.d.
Union Oil, No. 17 Cal. Coast, Orcutt, Santa Barbara	26- 9-34	4,515	looks wet
Union Oil, No. 20 Squires, Orcutt, Santa Barbara	27- 9-34	2,141	sd. sh. drlg.
Cole, F. E., No. 16 Santa Maria, Santa Barbara	23-10-34	3,315	sd. sh. drlg.
Getty, George F., No. 2-V, Santa Maria, Santa Barbara	27-10-34	4,283	sd. sh. drlg.
Pac. West. Oil, No. 6-H, Santa Maria, Santa Barbara	21-10-34	4.988	pump. 520 b.d.
Pac. West. Oil, No. 2-S, Santa Maria, Santa Barbara	27-10-34	2,280	sd. sh. drlg.
Pima Drlg., No. 1 Morganti, Casmalia, Santa Barbara	13- 9-35	1,496	sd. sh. drlg.
Standard Oil, No. 1 Cat Canyon, Santa Barbara	27- 9-33	3,796	sd. sh. drlg.
Tweedy, A. E., No. 1 Penn, Capitan, Santa Barbara	34- 5-31	1,215	sd. sh. drlg.
Texas Co., No. 134 Shiells, Shiells Canyon, Ventura	4- 3-19	4,480	P.B. 3,814
High Mesa Oil, No. 1 Butcher, Ojai, Ventura	16- 4-22	1,298	hd. sd. drlg.
Richfield Oil, No. 1 McFarland, Camarillo, Ventura	13- 2-21	7,432	gr. sd. drlg.
Texas Co., No. 1 Edwards, Camarillo, Ventura	19- 2-21	5,797	sd. sh. drlg.
Trucano, G., No. 1 Simi, Ventura	5- 2-17	715	gr. sh. drlg.
Stalling & Senter, No. 1 Timber Canyon, Ventura	24- 4-21	430	O.S. drlg.
Section 20 Oil, No. 1 Sespe, Ventura	20- 5-19	1,030	hd. sh. drlg.
Speik Oil, No. 2 Sespe, Ventura	33- 5-19	3,450	bailed dry
Colima Oil, No. 2 Sespe, Ventura	25- 5-19	2,500	idle
Garmack Oil, No. 1 Orcutt, Sespe, Ventura	28- 5-19	348	sd. sh. drlg.
Condor Oil, No. 1 Dorman, Sespe, Ventura	6- 4-19	2,193	fish. bailer
Skyline Oil, No. 1-H Hopper Canyon, Ventura	13- 4-19	2,631	sd. sh. drlg.
Commander Oil, No. 6-F Hopper Canyon, Ventura	13- 4-19	2,027	recmtd. 1,300
Continental Oil, No. 8-A Grubb, S. Miguelito, Ventura	24- 3-24	5,594	O.S. drlg.
C. C. M. Oil, No. 11 Rincon, Ventura	17- 3-24	4,166	P.B. 4,055
Richfield Oil, No. 1 State, Rincon, Ventura	17- 3-24	4,281	redrlg. 2,310
Rowe, W. G., No. 1 Johnson, Oxnard, Ventura	15- 1-22	2,276	sd. sh. drlg.
Tide Water A. O., No. 19 V.L.W., Ventura, Ventura	26- 3-23	4,687	sd. sh. drlg.
Tide Water A. O., No. 32 V.L.W., Ventura, Ventura	24- 3-23	7,210	flow. 1,324 b.d
Tide Water A. O., No. 41 V.L.W., Ventura, Ventura	24- 3-23	2,186	sd. sh. drlg.
Tide Water A. O., No 69 Lloyd, Ventura, Ventura	27- 3-23	5,191	sd. sh. drlg.
Tide Water A, O., No. 79 Lloyd, Ventura, Ventura	27- 3-23	2,143	sd. sh. drlg.
Tide Water A. O., No. 135 Lloyd, Ventura, Ventura	27- 3-23	8,665	hd. sh. drlg.
Tide Water A. O., No. 138 Lloyd, Ventura, Ventura	23- 3-23	7,351	hd. sd. drlg.
Tide Water A. O., No. 18 Hartman, Ventura, Ventura	22- 3-23	9,720	O.S. drlg.
Shell Oil, No. 92 Taylor, Ventura Ave., Ventura	20- 3-23	8,484	flow. 3,845 b.d.
General Pet., No. 13 Notten, Ventura Ave., Ventura	28- 3-23	9,880	sd. sh. drlg.
Amerada Pet., No. 5 Beer, Devils Den, Kern	22-26-19	5,973	br. sh. drlg.
Rocima Oil, No. 1 Laymance, McKittrick, Kern	20-30-22	2,474	sd. sh. drlg.
Standard Oil, No. 2 Randolph, Semi-Tropic, Kern	14-27-23	8,575	sd. sh. drlg.
Continental Oil, No. 2 KCL, Wasco, Kern	8-27-24	12,115	gr. sd. drlg.
Chico-Martinez Oil, No. 1 South Belridge, Kern	1-29-20	668	sd. sh. drlg.
Ohio Oil, No. 1 Ford, South Belridge, Kern	6-29-22	2,027	idle
Belridge Oil, No. 27-7 North Belridge, Kern	27-27-20	5,497	br. sh. drlg.
Belridge Oil, No. 27-8 North Belridge, Kern	27-27-20	7,160	br. sh. drlg.
Belridge Oil, No. 27-61 North Belridge, Kern	27-27-20	8,210	br. sh. drlg.
Belridge Oil, No. 28-1 North Belridge, Kern	28-27-20	7,581	br. sh. drlg.
Tide Water A. O., No. 7 Reward, No. Belridge, Kern	34-27-20	7.197	br. sh. drlg
Tide Water A. O., No. 1-21 North Belridge, Kern	21-27-20	7.201	cleaning out
Tide Water A. O., No. 2-21 North Belridge, Kern	21-27-20	6,291	br sh. drlg.
Richfield Oil, No. 1-A North Belridge, Kern	22-27-20	4,661	br. sh. drlg.
Texas Co., No. 2 Martin, North Belridge, Kern	22-27-20	7,596	br. sh. drlg.
Texas Co., No. 3 Martin, North Belridge, Kern	22-27-20	3.680	sd. sh. drlg.
General Pet., No. 1 St. Helens, Belridge, Kern	12-28-20	6,004	sd. sh. drlg.
Crestmont Oil, No. 2 Staley, Round Mountain, Kern	8-28-29	1,780	rig. to pump
Eastmont Oil, No. 5 Olcese, Round Mountain, Kern	16-28-29	1,775	sd. sh. drlg.
Richfield Oil, No. 1 Olcese, Round Mountain, Kern	17-28-29	971	sd. sh. drlg.
McDonald, J. A., No. 2 Bell, Round Mountain, Kern	12-28-28	1,995	pump. 445 b.d.
Shell Oil, No. 19 Caldwell, Round Mountain, Kern	7-28-29	1,794	pump. 150 b.d.
Shell Oil, No. 2 Olcese, Round Mountain, Kern	21-28-29	1,810	O.S. drlg.
Long, Harry, No. 1 Coffee, Round Mountain, Kern	2-28-28	984	sd. sh. drlg.
Vedder, D. G., No. 4 Bell, Round Mountain, Kern	12-28-28	1,836	rig. to pump
Vedder, D. G., No. 5 Bell, Round Mountain, Kern	12-28-28	1,776	sd sh. drlg.
Marcan Oil, No. 2 C.L. Round Mountain, Kern	12-28-28	2,031	rig. to pump
Marcan Oil, No. 3 C.L. Round Mountain, Kern	12-28-28	1,793	sd. sh. drlg.
V. & W. Oil, No. 1 Robinson, Kern Front, Kern	28-28-27	2,550	sd. sh. drlg.
California Star Oil, No. 3-80 Kern Front, Kern	22-28-27	2,755	cleaning out
Kern River Oilfields, No. 25-4-B Kern Front, Kern	25-28-27	2,074	sd. sh. drlg.
Sunset Oil, No. 3-1 Wells, Mount Poso, Kern	3-27-28	1,484	pump. 55 b.d.
North American Oil, No. 1 Mount Poso, Kern	26-27-27	3,228	dry; abd.
Pebble Beach Oil, No. 6 Newhope, Mount Poso, Kern	29-27-27	2,653	cleaning out
Shell Oil, No. 1 Keystone, Deep Well Ranch, Kern	4-26-27	2,581	sd. sh. drlg.
Western Gulf Oil, No. 30-B KCL, Fruitvale, Kern	14-29-27	3,070	flow. 425 b.d.
Western Gulf Oil, No. 31-B KCL, Fruitvale, Kern	14-29-27	139	sd. sh. drlg.
Cal-West Oil, No. 1 KCL, Fruitvale, Kern	14-29-27	2,998	sd. sh. drlg.
Pacific O. & G., No. 1-F, Fruitvale, Kern	14-29-27	3,017	pump. 340 b.d.
Texas Co., No. 1 Bastain, Mountain View, Kern	34-30-29	2,574	sd. sh. drlg.
Hogan Pet., No. 5 Symons, Mountain View, Kern	4-31-29	6,129	redrlg. 5,790
General Pet., No. 1 Houchin, Arvin, Kern	27-31-29	7,361	pump. 163 b.d.
McClurkin Oil, No. 1 Edison, Kern	6-30-29	2,593	idle
Petrex, Inc., No. 1 Arvin, Kern	32-31-30	3,198	sd. sh. drlg.
Superior Oil, No. 1 Wagner, Rio Bravo, Kern	35-28-25	7,397	sd. sh. drlg.
Superior Oil, No. 1 Geissinger, Rio Bravo, Kern	32-28-25	2,287	sd. sh. drlg.
Superior Oil, No. 1 Ruhl, Rio Bravo, Kern	1-29-25	175	sd. sh. drlg.
Union Oil, No. 2-34 KCL, Rio Bravo, Kern	34-28-25	7,193	sd. sh. drlg.
Getty Oil, No. 1 Ramsey, Rio Bravo, Kern	35-28-25	246	sd. sh. drlg.
General Pet., No. 1 Wagner, Rio Bravo, Kern	35-28-25	176	sd. sh. drlg.
Continental Oil, No. 1 Rosedale, Kern	12-29-26	10,210	redrlg. 9,463
Superior Oil, No. 1 Krause, Greeley, Kern	21-29-26	8,178	idle
Superior Oil, No. 9 KCL, Greeley, Kern	3-30-26	7,870	idle
Standard Oil, No. 11-2 KCL, Greeley, Kern	20-29-26	8,720	sd. sh. drlg.
Standard Oil, No. 11-8-A KCL, Greeley, Kern	18-29-26	7,846	flow. 150 b.d.
Standard Oil, No. 11-11 KCL, Greeley, Kern	17-29-26	7,810	flow. 550 b.d.
Standard Oil, No. 11-12 KCL, Greeley, Kern	20-29-26	7,790	br. sh. drlg.
Standard Oil, No. 12-3 KCL, Greeley, Kern	16-29-26	5,135	idle
Standard Oil, No. 17-1 KCL, Greeley, Kern	9-29-26	8,597	sd. sh. drlg.
Standard Oil, No. 15-1 KCL, Ten Section, Kern	27-30-26	8,070	cmtd. 8,000
Shell Oil, No. 32-29-A KCL, Ten Section, Kern	29-30-26	7,697	sd. sh. drlg.
Shell Oil, No. 85-25-B KCL, Ten Section, Kern	25-30-26	6,990	sd. sh. drlg.
Shell Oil, No. 52-31-B KCL, Ten Section, Kern	31-30-26	5,594	sd. sh. drlg.
Shell Oil, No. 27-30-B KCL, Ten Section, Kern	30-30-26	8.299	will P.B.
Shell Oil, No. 72-14-A KCL, Canal, Kern	14-30-25	8,036	hd. sh. drlg.
Ohio Oil, No. 4-E KCL, Canal, Kern	13-30-25	6,991	sd. sh. drlg.
Ohio Oil, No. 8-A KCL, Buena Vista Lake, Kern	32-31-26	2,897	sd. sh. drlg.
Merritt-Annex Oil, No. 7 Midway-Sunset, Kern	25-12-24	3.266	hd. sd. drlg.
C. C. M. Oil, No. 76-6 Midway-Sunset, Kern	6-32-23	1,150	cleaning out
Pattiway Oil, No. 4 Midway-Sunset, Kern	12-11-24	1,477	sd. sh. drlg.
Hoyt, Otis, No. 8 Midway-Sunset, Kern	7-11-23	1,398	sd. sh. drlg.
Iriquois Oil, No. 2 Midway-Sunset, Kern	7-11-23	1,800	sd. sh. drlg.
Chemeketa Oil, No. 1 Midway-Sunset, Kern	15-32-23	2,050	sd. sh. drlg.
Signal Oil, No. 4 Kendon, Midway-Sunset, Kern	35-32-23	2,373	br. sh. drlg.
Victor Oil, No. 14 Midway-Sunset, Kern	35-32-23	2,006	O.S. drlg.
Ethel D. Oil, No. 21-A Midway-Sunset, Kern	36-12-24	1,261	sd. sh. drlg.
National Oil, No. 17 Midway-Sunset, Kern	35-32-23	1,136	sd. sh. drlg.
Texas Co., No. 1 Pioneer, Midway-Sunset, Kern	33-11-23	6,280	gr. sd. drlg.
Texas Co., No. 25 Midway-Sunset, Kern	32-32-24	3,170	redrlg. 3,130
Texas Co., No. 30 Midway-Sunset, Kern	32-32-24	3,242	reaming
Richfield Oil, No. 1-D-A, Elk Hills, Kern	1-31-24	2,276	sd. sh. drlg.
Richfield Oil, No. 11-D-A Elk Hills, Kern	1-31-24	3,359	pump. 90 b.d.
Ohio Oil, No. 2-D Tejon, Kern	23-11-19	5,599	sd. sh. drlg.
Petrol Corp., No. 1 Tejon, Kern	32-11-19	2,286	sd. sh. drlg.

KEY TO ABBREVIATIONS USED IN DRILLING REPORTS

Abd., abandoned.
Acd., acidized.
B.O., barrels of oil.
B.P.D., barrels per day.
B.D., barrels daily.
B.P., back pressure.
B.R., building rig.
Br. sh., brown shale.
B.S., basic sediment.
Cd. or Crd., cored.
C.D., corrected depth.
Cg., coring.
Cmtd., cemented.
C.O., cleaning out.
Comp., completed.
Compr., compressor.
C.P., casing pressure, also cement through perforations.
Csg., casing.
D.D., drilling (or drilled) deeper.
Drlg. or Drg., drilling.
Drk. or Dk., derrick.
D.S., drill stem.
D.&A., dry and abandoned.
Fsg., fishing.
Gbo., gumbo.
G.I., gas injection.
Gr., gravity.
Gr. sd., gray sand.
Grn. sh., green shale.
Hd. sd., hard sand.
H.F.W., hole full of water.
I.P., initial production.
L., lime.
L.D.D., later drilled deeper.
Lnr., liner.
Loc., location.
M.I.M., moving in material.
M.I.R., moving in rig.
M.I.R.T., moving in rotary tools.
M.O.T., milling on tools.
O.I.H., oil in hole.
O.S., oil sand.
O.T.D., old total depth.
O.W.D.D., old well drilling deeper.
O.W.P.B., old well plugging back.
P.B., plugging or plugged back.
P.B.P., pulling or pulled big pipe.
P.L., pipe line.
P.L.O., pipe line oil.
Pmpg., pumping.
P.O.P., putting on pump.
P.P., pulled pipe.
Rd. sd., red sand.
Rd. sh., red shale.
Recmt., recemented.
Rmg., reaming.
Redrlg., redrilling.
Rng., running.
R.O.G., rig on ground.
R.P., rock pressure.
R.U., rigging up.
R.U.R., rigging up rotary.
R.U.S.T., rigging up standard tools.
R.&T., rods and tubing.
S. or Sd., sand.
S.D., shut down.
Sdy. sh., sandy shale.
Sdtr., or St. sidetracking.
S.D.P.L., shut down for pipe line.
S.D.O., or S.D.W.O., shut down awaiting orders.
S.G., show gas.
Sh.&L., shale and lime.
S.I., shut in.
S.I.P., shut in, prorated.
S.L.M., steel line measurement.
S.O., show oil.
S.O.G.&W., show of oil, gas and water.
Spdg. or Spd., spudding.
S.R., straightreaming.
Stdg., standardizing (also standing).
S.W., salt water.
Swbg., swabbing.
T.A., temporarily abandoned.
Tbg., tubing.
T.D., total depth.
T.P., tubing pressure.
Tr., tract.
U.R., underreaming.
W.I.H., water in hole.
W.O., workover.
W.O.C. or W.O.C.S., waiting for cement to set.
W.P., working pressure.
W.S.O., water shutoff.
W.S.S.O.K., water shutoff O.K.
W.S.O.N.G., water shutoff no good.
W.S.R. or W.O.S.R., awaiting standard rig.
Wtr., water.

Honolulu Oil, No. 33-1 SP, Tejon, Kern	33-12-19	6,284	sd. sh. drlg.
Shell Oil, No. 4-26 KCL, San Emidio, Kern	26-11-22	5,450	sd. sh. drlg.
Pure Oil, No. 1 Cantua, Fresno	31-18-17	10,100	hd. sh. drlg.
Union Oil, No. 1 Nicholson, Cantua, Fresno	17-15-15	5,871	sd. sh. drlg.
West. Gulf Oil, No. 4 S.P.L. Cantua, Fresno	3-17-15	4,671	sd. sh. drlg.
Superior Oil, No. 1 C.U.P., Fresno	20-16-13	2,137	sd. sh. drlg.
Dauphin Dev., No. 1 Alcade, Fresno	30-21-14	3,755	gr. sd. drlg.
Jacalitos Oil, No. 1 Jacalitos, Fresno	14-21-15	5,798	sd. sh. drlg.
Pet. Sec., No. 2 Gatchell, Jacalitos, Fresno	18-20-16	1,997	sd. sh. drlg.
Grimes, F. C., No. 1 Coalinga, Fresno	12-20-15	548	sd. sh. drlg.
Central Valley Oil, No. 1 Joaquin, Fresno	1-12-20	471	sd. sh. drlg.
K. N. D. A., No. 4-18-J Kettleman North, Fresno	18-21-17	11,746	P.B. 10,810
K. N. D. A., No. 67-20-J Kettleman North, Fresno	20-21-17	8,680	sd. sh. drlg.
K. N. D. A., No. 72-4-P Kettleman North, Fresno	4-22-17	6,061	br. sh. drlg.
K. N. D. A., No. 83-4-P Kettleman North, Fresno	4-22-17	8,500	cleaning out
K. N. D. A., No. 27-12 P Kettleman North, Kings	12-22-17	8,060	swabbing
K. N. D. A., No. 38-12-P Kettleman North, Kings	12-22-17	7,991	gr. sd. drlg
K. N. D. A., No. 6-6-Q Kettleman North, Kings	6-22-18	8,690	PB. 8,189
K. N. D. A., No. 27-6-Q Kettleman North, Kings	6-22-18	8,990	sd. sh. drlg.
Standard Oil, No. 27-21-J Kettleman North, Fresno	21-21-17	9,498	hd. sd. drlg.
Standard Oil, No. 2-11-P Kettleman North, Kings	11-22-17	7,850	tested wet
Standard Oil, No. 76-1-P Kettleman North, Kings	1-22-17	8,066	hd. sd. drlg.
Standard Oil, No. 21-13-P Kettleman North, Kings	13-22-17	6,560	hd. sh. drlg.
Standard Oil, No. 41-7-Q Kettleman North, Kings	7-22-18	4,983	sd. sh. drlg
Superior Oil, No. 5 Huffman, Kettleman No., Fresno	29-21-17	10,475	P.B. 10,274
Union Oil, No. 1 King, Kettleman North, Fresno	29-21-17	8,310	cleaning out
Bandini Pet., No. 5 Whepley, Kettleman No., Fresno	35-21-17	8,997	sd. sh. drlg.
Temblor Oil, No. 1-B Kettleman Middle, Kings	25-23-18	9,138	idle
Amerada Pet., No. 1 Carano, Los Banos, Merced	19-10-11	7,710	gr. sd. drlg.
Standard Oil, No. 2 Weyl, McDonald Is., San Joaquin	25- 2-4	7,497	gr. sd. drlg.
Standard Oil, No. 1 Morris, Delano, Tulare	36-24-23	11,460	D.P. froze
Wilshire Oil, No. 1 Half Moon Bay, San Mateo	20- 6-5	6,252	sd. sh. drlg.
Ohio Oil, No. 1 Willard, Glenn	18-20-2	4,480	blew out

IMPORTANT WELLS AND SOUTHERN CALIFORNIA WILDCATS

Company, well and location:	S.T.R.	Depth	Status
Richfield Oil, No. 2-M, El Segundo, Los Angeles	12- 3-15	7,354	Schist; drlg.
Richfield Oil, No. 1-H El Segundo, Los Angeles	18- 3-14	7,500	sd. sh. drlg.
Sunshine Oil, No. 1 G.W., El Segundo, Los Angeles	12- 3-15	7,195	flow. 585 b.d.
Apex Pet., No. 1-C El Segundo, Los Angeles	12- 3-15	5,897	sd. sh. drlg.
Termo Co., No. 2 El Segundo, Los Angeles	12- 3-15	4,761	sd. sh. drlg.
Texas Co., No. 6 Security, El Segundo, Los Angeles	18- 3-14	7,172	sd. sh. drlg.
Standard Oil, No. 4 Ref., El Segundo, Los Angeles	13- 3-15	7,340	pump 250 b.d.
Standard Oil, No. 7 Ref., El Segundo, Los Angeles	13- 3-15	7,147	oil conglom.
Standard Oil, No. 8 Ref., El Segundo, Los Angeles	13- 3-15	1,600	cmtd. 1,598
Howard Oil, No. 1 El Segundo, Los Angeles	12- 3-15	7,474	sd. sh. drlg.
Lakeside Oil, No. 10-1 Elsie, El Segundo, Los Angeles	12- 3-15	7,400	testing
Wilshire Oil, No. 1 Const., El Segundo, Los Angeles	12- 3-15	5,285	sd. sh. drlg.
Wilshire Oil, No. 2-1 Elsie, El Segundo, Los Angeles	12- 3-15	6,897	sd. sh. drlg.
Wilshire Oil, No. 2 Sec., El Segundo, Los Angeles	12- 3-15	6,955	sd. sh. drlg.
Union Oil, No. 16-D.R., Playa Del Rey, Los Angeles	28- 2-15	6,099	redrlg. 4,192
Standard Oil, No. 84 LAI, Inglewood, Los Angeles	17- 2-14	4,073	sd. sh. drlg.
Patton, C. B., No. 2 Torrance, Los Angeles	16- 6-14	3,747	will deepen
Peyton, D. F., No. 1 Torrance, Los Angeles	16- 6-14	3,800	deepening
Richfield Oil, No. 6-L Torrance, Los Angeles	16- 6-14	3,792	will deepen
Grubb, E. M., No. 2 Torrance, Los Angeles	16- 6-14	3,701	will deepen
Jameson Oil, No. 1 Wash, Torrance, Los Angeles	16- 6-14	3,863	will deepen
Rolling Hills Pet., No. 1 Palos Verdes, Los Angeles	27- 4-14	2,715	sd. sh. drlg.
Tide Water A. O., No. 15 D.F. Dominguez, L. Angeles	34- 3-13	4,365	pump. water
Shell Oil, No. 18 Reyes, Dominguez, Los Angeles	33- 3-13	4,244	redrlg. 4,016
Shell Oil, No. 92 Reyes, Dominguez, Los Angeles	33- 3-13	7,732	pump. 110 b.d.
Shell Oil, No. 93 Reyes, Dominguez, Los Angeles	33- 3-13	5,874	sd. sh. drlg.
Union Oil, No. 49 Hellman, Dominguez, Los Angeles	33- 3-13	5,391	sd. sh. drlg.
Union Oil, No. 57 Callender, Dominguez, Los Angeles	33- 3-13	7,790	cleaning out
Union Oil, No. 58 Callender, Dominguez, Los Angeles	33- 3-13	622	sd. sh. drlg.
Selbar Oil, No. 1 Harris, Dominguez, Los Angeles	33- 3-13	4,388	cmtd. 4,340
Barnsdall Oil, No. 19 O'Dea, Rosecrans, Los Angeles	18- 3-13	6,595	sd. sh. drlg.
Union Oil, No. 35 H.P., Rosecrans, Los Angeles	18- 3-13	10,040	sd. sh. drlg.
Union Oil, No. 18-R, Rosecrans, Los Angeles	18- 3-13	3,252	sd. sh. drlg.
Texas Co., No. 5-1 Gardena, Los Angeles	30- 3-13	5,990	sd. sh. drlg.
Barnsdall Oil, No. 2-S.F., Newhall, Los Angeles	26- 4-17	6,390	hd. sd. drlg.
Towsley Canyon Oil, No. 1 Newhall, Los Angeles	8- 3-16	4,215	sd. sh. drlg.
Royal Lands, No. 1 Ramona, Castaic, Los Angeles	8- 4-17	366	hd. sd. drlg.
General Pet., No. 1 Blinn, Wilmington. Los Angeles	3- 4-13	3,290	sd. sh. drlg.
General Pet., No. 1 Harbor, Wilmington, Los Angeles	3- 5-13	2,840	sd. sh. drlg.
General Pet., No. 6 Harbor, Wilmington, Los Angeles	2- 5-13	3,490	O.S. drlg.
General Pet., No. 11-T Wilmington, Los Angeles	4- 5-13	2,930	P.B. 2,879
General Pet., No. 3-C Wilmington, Los Angeles	2- 5-13	3,055	sd. sh. drlg.
General Pet., No. 2-S.P., Wilmington, Los Angeles	2- 5-13	3,365	O.S. drlg.
Allied Pet., No. 23 Wilmington, Los Angeles	32- 4-13	3,051	O.S. drlg.
Bankline Oil, No. 4-C.Y., Wilmington, Los Angeles	34- 4-13	2,990	sd. sh. drlg.
Bankline Oil, No. 4-W Wilmington, Los Angeles	34- 4-13	3,608	sd. sh. drlg.
Bankline Oil, No. 2-U.P., Wilmington, Los Angeles	3- 5-13	2,389	sd. sh. drlg.
Baker Oil, No. 1 Wilmington, Los Angeles	35- 4-13	3,078	cmtd. 3,077
Black Gold, No. 5 Wilmington, Los Angeles	32- 4-13	3,386	O.S. drlg.
Black Gold, No. 7 Wilmington, Los Angeles	32- 4-13	3,060	sd. sh. drlg.
Caminol Co., No. 1-6-H, Wilmington, Los Angeles	2- 5-13	2,188	sd. sh. drlg.
Colter & McAdoo, No. 2 Wilmington, Los Angeles	32- 4-13	3,650	flow. 230 b.d.
Colter & McAdoo, No. 3 Wilmington, Los Angeles	32- 4-13	3,645	flow. 305 b.d.
Hancock Oil, No. 1-A Wilmington, Los Angeles	2- 5-13	2,284	sd. sh. drlg.
Lokern Dev., No. 1-B Wilmington, Los Angeles	33- 4-13	3,152	sd. sh. drlg.
L. B. Harbor Oil, No. 1-CC, Wilmington, Los Angeles	2- 5-13	1,177	sd. sh. drlg.
Macson Oil, No. 2-C, Wilmington, Los Angeles	32- 4-13	3,638	sd. sh. drlg.
Pongratz, Gus, No. 1-G, Wilmington, Los Angeles	32- 4-13	2,990	C.P. 992
Pongratz, Gus, No. 1-A Wilmington, Los Angeles	32- 4-13	3,060	sd. sh. drlg.
Royalty Serv., No. 1-K.Y., Wilmington, Los Angeles	33- 4-13	2,975	sd. sh. drlg.
Richfield Oil, No. 1-G, Wilmington, Los Angeles	2- 5-13	2,591	sd. sh. drlg.
Richfield Oil, No. 1-R.G., Wilmington, Los Angeles	35- 4-13	2,480	sd. sh. drlg.
Selegna Drlg., No. 14 Wilmington, Los Angeles	33- 4-13	3,625	sd. sh. drlg.
Superior Oil, No. 1-S.C., Wilmington, Los Angeles	4- 5-13	2,174	sd. sh. drlg.
Superior Oil, No. 1-C, Wilmington, Los Angeles	2- 5-13	3,290	O.S. drlg.
Superior Oil, No. 1-B.B., Wilmington, Los Angeles	4- 5-13	230	sd. sh. drlg.
Union Pacific, No. 62 Wilmington, Los Angeles	33- 4-13	3,456	rig. to pump
Union Pacific, No. 76 Wilmington, Los Angeles	34- 4-13	2,950	sd. sh. drlg.
Union Pacific, No. 78 Wilmington, Los Angeles	3- 5-13	3,409	sd. sh. drlg.
Union Pacific, No. 79 Wilmington, Los Angeles	34- 4-13	2,797	sd. sh. drlg.
Union Pacific, No. 80 Wilmington, Los Angeles	34- 4-13	2,902	sd. sh. drlg.
Union Pacific, No. 1-E Wilmington, Los Angeles	34- 4-13	1,365	sd. sh. drlg.
Union Pacific, No. 1-E.U. Wilmington, Los Angeles	34- 4-13	3,250	sd. sh. drlg.
Wilton Oil, No. 3 Wilmington, Los Angeles	32- 4-13	2,940	sd. sh. drlg.
Wilmington Oil, No. 2 Wilmington, Los Angeles	32- 4-13	5,703	flow. 180 b.d.
Alford Oil, No. 3-C.Y., Wilmington, Los Angeles	22- 4-13	6,399	sd. sh. drlg.
Ramsey, W. E., No. 1 Repetto Hills, Los Angeles	27- 1-12	3,075	sd. sh. drlg.
Texas Co., No. 18 Baldwin, Montebello, Los Angeles	5- 2-11	6,400	hd. sd. drlg.
Union Oil, No. 4 Flood Control, Los Angeles	13- 4-13	3,291	sd. sh. drlg.
Hilidon Oil, No. 3-A Flood Control, Los Angeles	13- 4-13	4,030	sd. sh. drlg.
Abrams, John, No. 1 Flood Control, Los Angeles	13- 4-13	4,247	recmtd. 4,223
Texas Co., No. 5 Bauman, Long Beach, Los Angeles	19- 4-12	3,845	sd. sh. dr'g.
Texas Co., No. 4 Gray, Long Beach, Los Angeles	20- 4-12	4,481	sd. sh. drlg.
Power, E. D., No. 3 Long Beach, Los Angeles	20- 4-12	3,182	sd. sh. drlg.
Shell Oil, No. 1 Hath, Long Beach, Los Angeles	28- 4-12	5,798	sd. sh. drlg.
Rico Pet., Inc., No. 1 Long Beach, Los Angeles	30- 4-12	4,012	cleaning out
Richfield Oil, No. 19 Haas, Long Beach, Los Angeles	19- 4-12	3,025	rig. to pump
Richfield Oil, No. 6-M.D., Long Beach, Los Angeles	19- 4-12	2,774	test. W.S.O.
Union Oil, No. 100 Santa Fe Springs, Los Angeles	6- 3-11	11,314	cleaning out
Texas Co., No. 7-W Santa Fe Springs, Los Angeles	6- 3-11	6,803	pump water
Continental Oil, No. 20 Bixby, Seal Beach, Orange	2- 5-12	7,501	redrlg. 6,164
Lido Pet., No. 2 Severns, Huntington, Orange	34- 5-11	5,042	pump. 525 b.d.
Standard Oil, No. 34-A Huntington, Orange	34- 5-11	3,654	sd. sh. drlg.
W. P. R. Oil, No. 3 Huntington, Orange	35- 5-11	5,410	deep test
Shell Oil, No. 4-1 Columbia, Olinda, Orange	9- 3-9	5,000	pump. 30 b.d.
Brea Canyon Oil, No. 36 Brea Canyon, Orange	2- 3-10	4,552	redrlg. 2,776
Standard Oil, No. 127 Murphy, West Coyote, Orange	18- 3-10	3,240	cmtd. 3,224
Severns Drlg., No. 2 McNally, West Coyote, Orange	18- 3-10	7,272	redrlg. 4,360
Union Oil, No. 29 Chapman, Richfield, Orange	29- 3-9	10,150	sd. sh. drlg.
Standard Oil, No. 2-26 Kraemer, Richfield, Orange	32- 3-9	170	sd. sh. drlg.
Oil Income, No. 1 Anderson, Yorba, Orange	22- 3-9	2,182	P.B. 1,765
Hjorth & Mohr, No. 1 Yorba, Orange	22- 3-9	1,403	cleaning out
Berco Oil, No. 1 Milhous, Yorba, Orange	22- 3-9	1,750	cmtd. 1,508
Angelus Oil, No. 1 Jacobs, Yorba, Orange	22- 3-9	1,691	cleaning out
Fairfield, F. E., No. 1 Dutton, Yorba, Orange	22- 3-9	1,576	sd. sh. drlg.
Oliver & Owen, No. 1 Moritz, Yorba, Orange	22- 3-9	1,650	bailing
Shell Oil, Core Hole H., Young, Yorba, Orange	16- 3-9	2,900	fish. D.P.
Selegna Oil, No. 1-A Chino, San Bernardino	12- 3-8	1,785	sd. sh. drlg.

KANSAS

Week Ending January 15 (Descriptions are East unless marked otherwise)

Barber County

Helmerich & Payne No. 1 Winter, NW SW sec. 16-32-10w. Wilcox 4,768-70 ft.

Kansas Oil Corp. No. 1 Mease, NE SE SE sec. 27-30-11w. Arb. 4,896-4,910 ft.; S.D.O.

Palmer Oil Corp. et al No. 1 Warwick, C NW sec. 29-31-10w. Rig.

Barton County

Elmer Ash et al No. 1 Frees, NW cor. sec. 34-16-11w. Drlg. 3,340 ft.

R. E. Day et al No. 1 Felts, SE SE NE sec. 14-16-12w. S.D. 1,875 ft.

Martin & Foraker et al No. 1 Dick Est., NE SW SW sec. 31-19-11w. Rig.

C. L. Price No. 1 Hammeke, NE NE SW sec. 12-18-12w. Sil. 3,415-27 ft.; 1,800 ft. O.I.H.; bails 4 bbls. wtr. every other day.

Sinclair Prairie Oil Co. No. 1 Oser, NE SE sec. 17-16-11w. Drlg. 2,633 ft.

Thayer Drlg. Co. et al No. 1 Soderstrom, SE NW sec. 21-17-13w. Pay 3,223 ft.; T.D. 3,230 ft.; pmp. 12 B.O.P.H.

Butler County

T. S. Dustin No. 1 Miley, SE NW NE sec. 17-27-5e. S.D. 395 ft.

Steinbuchel et al No. 1 Fox, NW SE NE sec. 25-26-3e. S.D. 1,010 ft.

Chase County

T. D. Duffy No. 1 Leedy, NE NW NW sec. 26-22-9. Fsg. 635 ft.

Chautauqua County

Harrison No. 1 Brown, NE SE NE sec. 19-34-10. S.D. 820 ft.

I. W. Siegel No. 1 Temple, SW cor. sec. 31-32-12. S.D. 400 ft.

Clark County

Olson Oil Co. No. 1 Lehman, SE SW sec. 20-32-31w. Drlg. 5,487 ft.

Olson Oil Co. et al No. 1 Watkins, SW NW sec. 23-32-21w. Arb. 6,700-60 ft., T.D.; no show.

Cowley County

Dickey Oil Co. No. 1 Kansas G. & E., NE cor. sec. 22-34-3e. Chat 3,302-47 ft.; S.D.O.

Roth et al No. 1 Fry, NW SW SW sec. 8-31-3e. T.D. 2,660 ft.; D.&A.

Trees Oil Co. and Talbott No. 1 McMinn, NE NW sec. 16-31-6. Drlg. 1,410 ft.

Earl Wakefield No. 1 Whitson, SW NE NE sec. 8-32-4e. T.D. 3,294 ft.; P.B. 3,292 ft.; pmpd. 25 B.O. and 21 B.W. in 24 hrs.

Ellis County

C. L. Carlock No. 1 Heyle, SE NW sec. 14-13-16w. Sil. 3,405 ft.; 6 B.W. 3,440 ft., T.D.

Colonial Oil Co. No. 1 Hadley, SE NE SE sec. 12-11-18w. Set 15-in. csg. 48 ft.; W.O.C. 128 ft.

General Mach. & Tool Co. No. 1 Jensen, SW SE NE sec. 26-12-18w. H.F.W. 3,708-11 ft.; D.&A.

Glimac Oil Co. et al No. 1 K. C. Life SE SW NW sec. 5-11-18w. T.D. 3,373 ft.; 3,000 ft. O.I.H. in 14½ hrs.

Hays & Sackrider No. 1 Windholtz, NE cor. sec. 2-13-16w. Drlg. 825 ft.

J. J. Muth et al No. 1 Penney, C N½ NE SE sec. 29-14-18w. S.D. 350 ft.

P. G. Reynolds et al No. 1 Karlin, NW cor. sec. 13-12-18w. Sil. 3,674-75 ft.; cmtd. 6-in. csg. 3,674 ft.; W.O.C.

Ellsworth County

Cities Service Oil Co. et al No. 1 Schroeder, C N½ N½ NW sec. 29-17-9w. Drlg. 2,745 ft.

Colonial Oil Co. No. 1 Hogy, NW cor. sec. 16-16-10w. U.R. 10-in. 2,155 ft.

Ralph Wixson et al No. 1 Peterman, SW cor. sec. 28-17-10w. S.D. 1,920 ft.

Greenwood County

John Nichols et al No. 1 Central Life, SE SW sec. 35-25-12. Spd. and S.D.

Harvey County

Allison et al No. 1 Hawks, SE SW NE sec 16-24-1w. T.D. 3,675 ft.; D.&A.

National Ref. Co. No. 1 Brown Bros., NW SE NE sec. 22-23-2w. Drlg. 2,492 ft.

Jackson County

Lemmick Oil Co. No. 1 Marble Savings Bank, NE cor. sec. 26-9-14. Spd. and S.D.

Jewell County

Hollingsworth Bros. No. 1 Wolfe, NE SW SE sec. 14-4s-8w. Spd. and S.D.

Lane County

Phillips Pet. Co. No. 1 Kees, C SE SE sec. 3-19-30w. Drlg. 3,710 ft.

McPherson County

Archer & Crane No. 1 Templin, NW SW SE sec. 32-17-3w. S.D. 2,200 ft.

Boyle & Grossman No. 1 Diener, SE SE NE sec. 35-19-1w. Drlg. 3,460 ft.

Carter Oil Co. No. 1 Hoglund, C W½ SW NW sec. 8-17-3w. Arb. 3,542-69 ft.; P.B. 3,373 ft.; acd.; est. 100 B.O.; installing pump.

Meade County

Pacific Mid-West Co. No. 1 Rexford, NE SE SW sec. 8-30-29w. S.D. 200 ft.; (cor.).

Ness County

Continental Oil Co. No. 1 Olson, SW NW SE sec. 5-18-25w. T.D. 4,325 ft.; acd.; pot. 653 B.O. and S.W.; comp.

Marshall Drlg. Co. et al No. 1 Anderson, SW NW sec. 23-16-24w. Spd. and S.D

Trojan O. & G. Co. No. 1 Moses, C SW NW sec. 10-18-25w. S.D. 500 ft.

Trojan O. & G. Co. No. 1 Page Milling Co., SE SE NW sec. 36-18-26w. Fsg. 3,265 ft.

Phillips County

C. W. Davidson et al No. 1 Elliff, SE NE NE sec. 35-5-18w. S.D. 600 ft.

Pratt County

Ohio Oil Co. No. 1 Howell, C SW SW sec. 21-29-15w. Drlg. 4,470 ft.

Reno County

Carey et al No. 1 McPheeters, NE NW sec. 22-26-8w. Drlg. 2,920 ft.

McCole et al No. 1 Mathews, SW NW NW sec. 15-24-10w. Rng. 15-in. csg. 475 ft.

Westgate-Greenland et al No. 1 Popp, SW SW NE sec. 7-25-4w. T.D. 4,136 ft.; D.&A.

Rice County

Joe Aylward No. 1 Welhe, SW NE sec. 23-18-9w. Drlg. 2,745 ft.

Price et al No. 1 Gemeinhardt, NE SE sec. 18-18-10w. Fsg. 2,230 ft.

Skiles et al No. 1 Campbell, SE NE sec. 28-19-9w. T.D. 3,210 ft.; acd.; pot. 252 B.O.; U.R. 5-in. csg.

Western Kansas Oil No. 1 Bailey, SW NW sec. 19-20-6w. Drlg. 2,435 ft.

W. E. Witt et al No. 1 Fair, NW SE SE sec. 4-22-8w. Chat 3,346-55 ft.; small increase in oil.

Rooks County

Graham et al No. 1 Fike, SW cor. sec. 9-9-17w. T.D. 3,326 ft. pmpd. 50 B.O. and 35 B.W. in 8 hrs.; S.D.O.

Producers Oil Co. No. 1 Ham, SW SW NW sec. 25-7-19w. C.O. 330 ft.

Rush County

Duwe & Brouk No. 1 Lebsack, SE SE NE sec. 13-16-16w. Sil. 3,492-95 ft.; 1,500 ft. sulfur water in hole in 2½ hrs.; T.D 3,512 ft.; S.D.O.

Russell County

Emrichs et al No. 1 Anderson, NE SE SW sec. 33-15-11w. Spd. and S.D.

Hess et al No. 1 Reinhardt, NE SW sec. 36-12-14w. Drlg. 215 ft.

Jones & Shelburne No. 1 Short, NE cor. sec. 21-15-12w. T.D. 3,338 ft.; D.&A.

Phil-Han & Hinkle No. 1 Reinhardt, SE SW sec. 19-14-14w. Pay 3,242-46 ft., T.D.; pmpd. 1,095 B.O. in 26 hrs.

Shields et al No. 1 Rogg, NW SW sec. 28-14-13w. T.D. 2,922 ft.; 1,900 ft. O. I.H.

Winkler & Koch No. 1 Jones, SE SE NW sec. 22-14-13w. Sil. 3,180 ft.; S.D.O.

Sedgwick County

Frank Hudson et al No. 1 Fulton, NE SE sec. 35-28-1e. Fsg. 1,550 ft.
McKnab No. 1 Garrett, SE SW SW sec. 18-29-2e. S.D. 100 ft.
I. W. Murfin et al No. 1 Martin, SE NW sec. 32-28-1e. T.D. 3,491 ft.; acd.; swb 45 B.O. in 24 hrs.
Reeves & Kinnan No. 1 Heim, SW cor. sec. 5-29-3w. Drlg. 3,785 ft.
Steinbuchel et al No. 1 McAdams, SW NE sec. 28-20-1e. Drlg. 1,920 ft.
Union O. & R. Co. et al No. 1 Howell, SW cor. sec. 6-29-1e. T.D. 2,400 ft.; S.D.

Stafford County

Carter Oil Co. No. 1 Andress, CNL SE sec. 2-21-13w. Drlg. 1,547 ft.
Cardinal Oil Co. et al No. 1 Sittner, SW cor. sec. 4-22-12w. Drlg. 3,617 ft.
Hipple et al No. 1 Moses, NW SW sec. 9-22-13w. H.F.W. 3,804-07 ft.; S.D.O.
Torrey & Feaster et al No. 1 Heggy, NE SW sec. 26-23-11w. Drlg. 3,443 ft.

Sumner County

Cities Service Oil Co. No. 1 McCoy, SE SW sec. 11-35-2e. Drlg. 3,690 ft.
W. M. McKnab No. 1 Blair, SW cor. sec. 7-30-1e. T.D. 3,869 ft.; swbs. 75 to 100 B.O.P.D.
Saco Oil Co. No. 1 Phipps, SW SE NE sec. 24-30-1w. Spd. and S.D.

Trego County

Carlock No. 1 Kinzel, SW SW sec. 9-13 22w. Spd. and S.D.

NEBRASKA WILDCATS

Arab Pet. Corp. et al No. 1 Ogle, SE SE sec. 9-1n-14e. Viola 3,019 ft.; Granite sec. 9-1n-14e, Richardson County. Viola 3,019 ft.; Gran. 3,423 ft., T.D.; S.D.O.

OKLAHOMA

Week Ending January 15

NORTHERN OKLAHOMA

Beckham County

Mid-American Oil Co. No. 1-A Biscoe, SW cor. sec. 28-8-22w. Drlg. 2,512 ft.

Caddo County

Indian Terr. illum. Oil Co. No. 1 Dome-Bo, C NE SE sec. 29-6-10w. T.D. 6,900 ft.; S.D.O.

Cleveland County

W. A. Delaney et al No. 1 Bugher, SE SE SW sec. 12-7-2w. Rig.
Harper-Turner No. 1 Pollock, C W½ NW NW sec. 13-9-2w. T.D. 6,850 ft.; drld. by pipe to 6,807 ft.; cmtd.

Creek County

M. W. Mosier et al No. 1 Holcomb, SE SW NW sec. 19-18-8. T.D. 3,018 ft.; 2,000 ft. W.I.H. and S.S.O.; S.D.

Garfield County

H. R. Hollenback et al No. 1 Clark, NW cor. sec. 34-21-6w. Drlg. 6,985 ft.

Garvin County

B. C. D. Edwards No. 1 Clark, NE cor. sec. 16-3n-3e. T.D. 2,676 ft.; P.B. 2,088 ft.; perf.; swb. 6 bbls. fluid in 1 hr.; est. half wtr.

Grady County

Doyle Pet. Co. No. 1 Huffine, NW NW SE sec. 30-5-8w. Drlg.
Gulf Oil Corp. No. 1 Thomas, SW NW NW sec. 14-4-5w. Drlg. sh. 9,850 ft.

Grant County

Magnolia Pet. Co. No. 1 Reynolds, NE NE SE sec. 19-25-5w. Drlg. 5,635 ft.

Greer County

R. W. McDonald No. 1 Fite, SE SE sec. 34-7-21w. Drlg. 420 ft.
J. I. Medlin et al No. 1 Broudie, NW cor. sec. 5-6n-20w. T.D. 90 ft.; (cor.); S.D.

Hughes County

Kenneth Ellison et al No. 1 Metropolitan. C NE NE sec. 14-7-9. Drlg. 4,104 ft.
Phillips Pet. Co. No. 1 Becker, NE NW SW sec. 8-5-10. Wilcox 5,747 ft.; drlg. 5,766 ft.
Pure Oil Co. No. 1 Rogers, SE SE NE sec. 18-8-12. T.D. 5,054 ft.; P.B. 3,394 ft.; drld. out to 3,600 ft.; H.F.W.; abd.

Kay County

F. S. Freeland et al No. 1-A Watson, NE NW NW sec. 28-28-1w. Rig on ground.
Helmerich & Payne No. 1 Scott, SE SE NE sec. 20-28-1w. Arb. 3,706 ft.; to core.
E. J. Shaffer et al No. 1 McKee, NE NW sec. 20-28-1w. T.D. 2,500 ft.; S.D.

Kiowa County

Gauntt & Baker No. 1 Parks, NW NW SW sec. 29-7-20w. T.D. 595 ft.; S.D.
Hughes & Reese No. 1 Fultz, SE cor. sec. 10-6-18w. T.D. 1,238 ft.; S.D.

Major County

Ed V. Parsons et al No. 1 Patzkowsky, C NW sec. 10-20-11w. Rig.

Okfuskee County

Broswood Oil Co. No. 1 Lehman, NW SW NW sec. 21-13-10. Drlg. 270 ft.
Mid-Continent Pet. Corp. No. 1 Inland.

LEGAL NOTICE

OSAGE OIL LEASES in units of 160 and 640 acres each, totaling 50,400 acres, will be sold at public auction, under Government supervision, at Pawhuska, Oklahoma, to the highest bidder, January 26, 1938. Sealed bids, accompanied by twenty-five per cent of amount offered on each tract, will be accepted, if received date preceeding sale. These tracts are scattered throughout an area of 1,500,000 acres, the minerals underlying which are owned as a whole by the Osage Tribe, and leases made therefor are approved by the Secretary of the Interior and operations conducted under Government regulations promulgated by him, thus eliminating controversies involving ownership of minerals. For detailed information write or wire the Superintendent, Osage Indian Agency, Pawhuska, Oklahoma.

SW NE SW sec. 10-13-10. Wilcox 3,420 ft.; T.D. 3,427 ft.; R.U.S.T.

Okmulgee County

Phillips Pet. Co. No. 1 Wood, NW SW SW sec. 31-11-13. T.D. 3,209 ft.; trying to shut off wtr.

Osage County

Norbla Oil Co. and Carter Oil Co. No. 1 Osage, NW cor. sec. 3-24-6. Spd.

Payne County

Mid-Continent Pet. Corp. No. 1 Ramsey, SW SW NW sec. 18-18-2e. Wilcox 4,768 ft.; T.D. 4,795 ft.; flwd. 555 B.O. in 1 hr.; est 11,000 bbls.; comp.

Pontotoc County

H. W. Lee No. 1 Weatherly, NW SE NW sec. 24-1n-7. Spd. and S.D.
Jack Lynch et al No. 1-A Parker, SW SW SE sec. 17-4-8. Spd.
H. Riddle et al No. 1 fee, NW SW SE sec. 11-3n-5e. Drlg. 2,925 ft.
Union Dev. Co. No. 1 Abbott, SW NW NE sec. 34-3-6. S.D. 3,320 ft.

Seminole County

H. V. Woodson and Marydun Oil Co. No 1 Gilliland, SE SW sec. 24-11-7. T.D. 4,069 ft.; drill pipe stuck.

Texas County

Hagey et al No. 1 Peck, C NE sec. 6-1n 13ecm. T.D. 2,842 ft.; pulled csg. and set whipstock.

Washita County

L. B. McWhirter No. 1 fee, NW SW SW sec. 34-8-19w. Drlg. 1,925 ft.

SOUTHERN OKLAHOMA

Atoka County

C. M. Sheldon and Gardner Pet. Co. No 1 Lee, NE NW SW sec. 2-4s-10e. Drlg. 2,200 ft.

Bryan County

Southern Oil Co. No. 1 Henry, NW NW NE sec. 10-8s-7. T.D. 1,585 ft.; hole off 6 deg.; P.B. 1,060 ft.; W.O.C.

Choctaw County

V. K. Chapman and T. N. Low No. 1 Hallum, NE NW NW sec. 4-7s-20. T.D. 340 ft.; fsg.
J. A. True No. 1 Boby, C NW SW sec. 17-7s-19e. T.D. 2,044 ft.; S.D.O.

Coal County

Carter Oil Co. No. 1 Claytor, C W½ NE SW sec. 27-2n-9e. T.D. 6,715 ft.; P.B 201 B.O. in 15 hrs.; swb. 67 B.O. in 14 hrs.; tstg.

Cotton County

Bowers & Wise No. 1 Pendergraft, NW SE SW sec. 4-4s-12w. Spd. 16 ft.; S.D.

Jefferson County

Massad & Swansberger No. 1 Barrett, NE SE SE sec. 14-6s-6w. T.D. 1,890 ft.; S.D.

Johnston County

Patton et al No. 1 McCrummins, C SW SW NE sec. 16-1s-6e. S.D. 1,380 ft.
W. T. Sheldon No. 1 Chapman, C NW NW sec. 26-4s-6e. Drlg. 2,810 ft.

Marshall County

Paul Robb et al No. 1 Vittitoe, C NE SE sec. 11-5s-4e. O.W.D.D.; C.O. to 720 ft.; S.D.

Murray County

Meyer & Greenup No. 1 Arbuckle, NW NW NE sec. 18-2s-3e. Spd. and S.D.
Sinclair Prairie Oil Co. No. 1 Lancaster Trust, C SW NE sec. 10-1-2e. T.D. 4,404 ft.; freeing stuck pipe.

Stephens County

Coline Oil Co. No. 1 Johnson, C SW SE SE NE sec. 1-2n-8w. T.D. 10,000 ft.; P.B 9,164 ft.; drld. new hole, 8,674 to 8,756 ft.; S.D. for wtr.
Helmerich & Payne No. 1 Pfile, SW cor. sec. 1-2s-7w. Drlg. 3,988 ft.

Tillman County

Cavens et al No. 1 Southerland, SW SW NW sec. 35-4s-16w. T.D 44 ft.; S.D
Smith No. 2 Hammell, NE NW NW sec. 6-5s-15w. Drlg. 1,581 ft.
Tom Walker No. 1 Bowman, SW SW NW sec. 10-4s-17w. S.D. 200 ft.

ARKANSAS

Clark County

Coker Oil Corp. No. 1 Coke, NW sec. 14-10-20. T.D. 2,770 ft.; hd. rk.

Columbia County

Kerr-Lynn Oil Co. No. 1 Barnett, sec. 14-17-20. Drlg. 6,779 ft.
E. O. Olds No. 1 Dennis, NE SE SW sec. 4-17-21. S.D.; contr. depth 4,513 ft.;

Crittendon County

Manning & Martin No. 1 Cartwright, SW cor. sec. 16-7n-8e. Drlg. 3,510 ft.

LaFayette County

Lillian Taubel et al No. 1 Tatum, NE cor. SE NW sec. 18-16-22. R.U.

Miller County—Rodessa

McClanahan et al No. 1-C Capps, E½ W½ Fract. sec. 14-20-28. Set 7-in. csg. 5,957 ft.; T.D. 6,048 ft.; tstd. S.S.O.&G.; will acd.
McClanahan & Feazel No. 2 Eason, C N½ NW SW sec. 12-20-28. R.U.
R. W. Newell No. 1 Thomas, NW SE sec. 12-20-28. Drlg. 5,460 ft.
Nivla Oil Corp. No. 1 Cross, SE cor. SE NE sec. 11-20-28. T.D. 6,106 ft.; set 7-in. csg. 6,104 ft.; perf. 6,040-95 ft.; acid.; S.D.
J. R. Ostrom No. 1 J. O. Gerrald, NW E½ sec. 15-20-28. Comp.; 25 B.P.D.; gas-lift; T.D. 6,079 ft.
Roberts Bros. Drlg. Co. No. 1-B Capps, C sec. 10-20-28. Comp.; 40 B.P.H.; ½-in. ck.; 5½-in. at 6,099 ft.; T.D. 6,124 ft.
Skelly Oil Co. No. 2 Thomas, NE cor. E½ SW sec. 12-20-28. Drlg. 5,729 ft.
Mrs. S. O. Thompson No. 2 Freer, SE cor. NE SE sec. 10-20-28. 13⅜-in. csg. 194 ft.; drlg. 2,059 ft.
Thompson & Joffra No. 1 Treadway, SE NE sec. 10-20-28. Set 7-in. csg. 6,116 ft.; T.D. 6,145 ft.

Nevada County

Benedum & Trees Oil Co. No. 1 Mitchell. Set 7-in. csg. 2,145 ft.; T. D. 2,146 ft.; 200 ft. fluid in hole; W.O.P.
Union Products & Pet. Co. No. 4 Haynie. NW sec. 6-14-20. 6-in. csg. 1,192 ft.; sd.; S.O. 1,170-78 ft.; W.O.P.
Bruce E. Wallace No. 2 Haynie, SE cor. sec 5-14-21. S.D. wtr. 28 ft.

Ouachita County

Copenhaven Oil Corp. No. 1 Evans, NE cor. NE SW sec. 20-11-19. Drlg. 1,825 ft.
A. H. Tarver et al No. 1 Dean Est., SW SE sec. 16-14-19. 7-in. csg. 1,305 ft.; T.D. 1,340 ft.
O. F. Whittacker No. 2 Guttry, NW sec. 21-15-19w. Sd. 2,164-2,208 ft.; W.O. pmp.

Pulaski County

A. L. Kitselman, No. 2 A. L. Kitselman Jr., SE SE SW sec. 2-1s-13e. Drlg. hd. bl. slate 1,969 ft.

Union County—Shuler

E. M. Jones No. 3 Marine Oil Co., NE NW SE sec. 17-18-17. Drk.
E. M. Jones et al No. 1-A Murphy Ld. Co. R.U. to deepen.
Lion Oil Ref. Co. No. 2 Marine Oil Co., SW cor. E½ SE¼ sec. 17-18-17. Drk.
Lion Oil Ref. Co. No. 1 Miller, SW cor. NE NW sec. 18-18-17. Pits.
Lion Oil Ref. Co. No. 4-A Edna Morgan, NW cor. Lot 1, SW sec. 18-18-17. R.U.
Lion Oil Ref. Co. No. 5-B Morgan, SE cor. W½ SE sec. 18-18-17. 16-in. at 103 ft.
Lion Oil Ref. Co. No. 4-B Edna Morgan NW SW SE sec. 18-18-17. Drlg. 7,304 ft.
Lion Oil Ref. Co. et al No. 1-C D. and J. C. Morgan, NE SE SE sec. 18-18-17. Oil sd. 7,518-42 ft.; T.D. 7,604 ft. comp.; 1,487 B.P.D.; 28/64-in. ck.
Marine Oil Co. No. 3 fee, SW sec. 17-18-17. T.D. 7,175 ft.; milling out split jt. in surf. csg.
Marine Oil Co. No. 4 fee, NW cor. SW SW sec. 17-18-17. R.U.
Marine Oil Co. No. 3 Justiss, NE cor. Lot 7, NW sec. 18-18-17. R.U.
Marine Oil Co. No. 4 Justiss, cen. Lot 7 NW sec. 18-18-17. 10¾-in. csg. 1,735 ft.
Phillips Pet. Co. No. 1 First Natl. Bk., NE SW sec. 17-18-17. Drlg. 5,891 ft.
Phillips Pet. Co. No. 1 Jennings, NW SW NE sec. 18-18-17. 7-in. csg. 7,708 ft.; T.D. 7,733 ft.; comp.; 55 B.P.H.; 40/64-in. ck.
Phillips Pet. Co. No. 2 Justiss, NW sec. 18-18-17. Drlg. 7,477 ft.
Phillips Pet. Co. No. 2 Marks, SW sec. 18-18-17. Drlg. 7,438 ft.
Alice Sydney Oil Co. No. 3 Morgan, NW NE SE sec. 18-18-17. Cg. 7,515 ft.
W. D. Wingfield, Tr., No. 1 Kidd Est., C NE NW SE sec. 15-18-13. R.U.

Union County—Other

Penn-Ark. Pet. Corp. No. 1 Raulston, sec. 12-17-14. Fsg. 3,175 ft.

LOUISIANA

NORTH LOUISIANA PROVEN

Caddo—Rodessa

F. W. Burford No. 3 Terry, sec. 2-23-16. Cg. 5,980 ft.
Clark Oil Corp. No. 1-C Sharp, sec. 4-23-16. Cg. 5,995 ft.
Standard Oil Co. of La. No. 1 Spearman, NE SE sec. 3-23-16. Drlg. 4,567 ft.
Standard Oil Co. of La. No. 1 Terry, SE SW sec. 2-23-16. Set 7-in. csg. 5,960 ft.; comp.; 315 B.P.D.; 22/64-in. ck.; T.D. 5,992 ft.
Standard Oil Co. of La. No. 2 Terry, sec. 2-23-16. Drlg. 5,867 ft.
Alice Sydney Oil Co. No. 1 Alexander, NW cor. sec. 3-23-16. Sd. 5,954-64 ft.; 7-in. csg. 5,947 ft.; T.D. 6,004 ft.
R. G. Trippett No. 1 Parker, NE cor. SE sec. 2-23-16. T.D. 6,022 ft.; tstd. 500,000 ft. gas; comp.; 24 B.P.D. dist. and 1,000,000 ft. gas; 15/64-in. ck.; T.D. 6,022 ft.
Union Prod. Co. No. 5 Harris, sec. 10-23-16. Set 7-in. 5,919 ft.; tstg. 5,959 ft.
Union Prod. Co. No. 6 Harris, sec. 10-23-16. Drlg. 4,157 ft.
G. H. Vaughn No. 1 Reeves, NE cor. sec. 3-23-16. Set 5½-in. csg. 5,953 ft.; T.D. 5,983 ft.; comp.; 441 B.P.D.; ¼-in. ck.

N. LOUISIANA WILDCATS

Bienville Parish

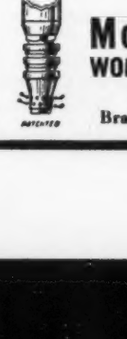
Gulf Ref. Co. No. 1 Goodpine, sec. 25-14-8. Cg. 7,029 ft.

Bossier Parish

Premier Inv. Co. No. 1 McDade, SE SW NE sec. 28-19-11. Drlg. sd.&sh. 1,235 ft.
Triangle Drlg. Co. No. 1-A Herold, NE NW sec. 13-17-12. Set 5½-in. csg. 3,094 ft.; T.D. 3,114 ft.; comp.; 228 B.P.D. and est. 1,000 bbls. S.W.; T.P. 60 lbs.; C.P. 390 lbs.
Union Prod. Co. No. 1-B Kerr Unit, SE sec. 24-17-12. Cg. 5,160 ft.

Caddo Parish

W. D. Chew No. 4 Spell, SE sec. 29-21-15. Set 6⅝-in. csg. 1,417 ft.; W.O.C.
W. P. Clark No. 1 Dyer, C sec. 10-20-16 Tstd. dry; W.O.; T.D. 2,279 ft.; D.&A.
Mrs. O. P. Clement No. 1-B Caddo Lvy Bd., NE sec. 5-20-16. T.D. 2,312 ft.; set 4-in. csg. 1,550 ft.; comp.; pmpg. 15 B.P.D.
Double "I" Oil Co. No. 1 Goodwin, NW cor. sec. 33-21-15. Set 6-in. csg. 1,410 ft.; T.D. 1,525 ft.
W. D. Flynn No. 3 Natalie, SW cor. sec. 10-21-16. Set 8-in. csg. 989 ft.; tstg. 1,029 ft.
Louisiana Oil Prod. Co. No. 3-D Muslow, SE cor. sec. 5-20-15. T.D. 2,156 ft.; set 7-in. csg. 2,144 ft.
Louisiana Oil Prod. Co. No. 4-D Muslow, SE cor. sec. 5-20-15. Set 7-in. csg. 2,134 ft.; T.D. 2,144 ft.
Louisiana Oil Prod. Co. No. 14-B Muslow, sec. 4-20-15. S.D. 2,130 ft.; high wtr.
La. Oil Prod. Co. No. 3-C Muslow, sec. 9-20-15. Set 7-in. csg. 2,136 ft.; T.D. 2,172 ft.; W.O.S.R.
Magnolia Pet. Co. No. 22 Dillon Hrs., NE NE sec. 23-21-15. Comp.; 22 B.P.D. on pmp.; T.D. 1,730 ft.



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J. F. Mitchell No. 1 Muslow, NE cor. sec. 31-21-15. Drlg. sh. 945 ft.
A. D. Robinson No. 1 Wilkinson, sec. 22-20-14. Set 5⅞-in. csg. 2,400 ft.; T.D. 2,451 ft.; tstd. S.W.; W.O.
J. E. Sedberry No. 1 Dickinson, NW sec. 15-19-14. Cg. 2,435 ft.
J. J. Shulman No. 1 Hobbs, NW sec. 28-21-15. Comp.; 10 B.P.D.; pmpg.; T.D. 1,630 ft.

Caldwell Parish

G. W. Ziegen No. 12 La. Cen. Lbr. Co., sec. 20-14-3e. R.U.

Catahoula Parish

G. C. Foster et al No. 1 Peck, S½ sec. 38-10-8e. Set 16-in. csg. 21 ft.; S.O.

Claiborne Parish

Atlantic Ref. Co. No. 2-B Bean, C S½ NW NE sec. 1-5-3E. Drlg. 2,962 ft.
Atlantic Ref. Co. No. 1-D Patton, C N½ SE SE sec. 29-21-4. Set 5⅞-in. csg. 5,227 ft.; T.D. 5,247 ft.
E. W. Gill No. 2 English, NW SE sec. 29-21-4. Set 5½-in. csg. 5,134 ft.; comp.; 73 B.P.H.; ½-in. ck.; T.D. 5,168 ft.
T. L. James No. 2 Fowler, NE SW sec. 32-21-4. R.U.
W. L. McClanahan No. 1 J. T. Lewis, W½ SW SE sec. 25-20-7. T.A. 5,507 ft.
Magnolia Pet. Co. No. 1 Fowler, C W½ NW SE sec. 28-21-4. Drlg. 4,980 ft.
A. O. Olson et al No. 2 English, NE SE sec. 29-21-4. R.U.
C. R. Schuster No. 1 S. Lloyd, SW SW sec. 2-20-5. T.D. 5,271 ft.; set 5½-in. csg.
Sloan & Zook No. 6 Patton Est., C W½ NE SW sec. 1-20-5. R.U.
Union Prod. Co. No. 2 Brownfield, sec. 5-19-5. O.W.D.D.; cg. 8,802 ft.
Union Prod. Co. No. 1-A Kilpatrick, sec. 11-19-6. Drlg. 3,412 ft.
G. H. Vaughn No. 3 Eppinger, C S½ NW SW sec. 29-21-4. Drlg. 2,607 ft.

Concordia Parish

Coastal Mineral & Dev. Co. No. 1 Winsten, NW cor. sec. 23-7-9e. Tstd. S.W. 2,090 ft.; P.B. 2,027 ft.; tested dry; S.D.; W.O.O.

De Soto Parish

Jal Drlg. Co. No. 10-A Scales, sec. 36-13-12. Set 5½-in. csg. 2,418 ft.; W.O.S.R.; T.D. 2,455 ft.
Pet. Heat & Power Co. No. 1 DeSoto Corp., SE cor. SW NW sec. 7-11-11. Drk.
Pet. Heat & Power Co. No. 1 Taylor, NE cor. NE SE sec. 12-11-12. Set 10-in. at 196 ft.

Franklin Parish

Southern Star Pet. Co. No. 2 Grayson, NE cor. NE SE sec. 36-12-6e. R.U.

La Salle Parish

Georgetown Oil Co. No. 1 Baldridge, NW cor. NE NW sec. 11-9-1e. T.D. 1,512 ft.; comp.; 40 B.P.D.; pmp.
Pet. Heat & Power Co. No. 1 Gaharan, Lot 7, Blk. 1, Holmes & Adams Addn., sec. 25-10-1e. Drk.
Pet. Heat & Power Co. No. 1 Russell, Lot 7, NW cor. NW SE SE sec. 26-10-1e. Set 6-in. csg. 1,518 ft.; T.D. 1,531 ft.; comp.; 200 B.P.D.; 20% S.W.
Stovall, Tr., No. 4 Russell, SE SE sec. 25-10-1e. 6-in. csg. at T.D. 1,518 ft.; W.O.S.R.
T. & J., Inc. No. 2 Tullos, SE NE sec. 26-10-1e. Set 6-in. csg. 1,514 ft.; T.D. 1,523 ft.

Lincoln Parish

F. H. Brown No. 1 Patton, C N½ SE SW sec. 6-20-4. Set 5½-in. csg. 5,356 ft.; T.D. 5,380 ft.
Delta Drlg. Co. No. 1 Weiss & Tatum, C S½ NW NE sec. 7-20-4. R.U.
Lundel Oil Corp. No. 1 Gill, NE NE NW sec. 36-20-2. D.&A. 6,000 ft.
Lyon & Neely No. 1-B Patton, SE SE sec. 6-20-4. Set 10¾-in. csg. 758 ft.
Magnolia Pet. Co. No. 2-B Corbin, NW NW sec. 5-20-4. Set 7-in. csg. 5,263 ft.; comp.; 37 B.P.H.; ½-in. ck.; T.D. 5,281 ft.
Magnolia Pet. Co. No. 1 Pollack, C N½ NE SE sec. 6-20-4. R.U.
E. T. Oakes & Easton No. 1 Griggs, sec. 36-18-1w. Set 5½-in. csg. 6,259 ft.; Schlumberger survey showed sat. 6,231-40 ft.; set 5½-in. at 6,121 ft.; T.D. 6,259 ft.

Morehouse Parish

W. J. Furlong No. 1 Clark, sec. 10-20-7e. Drlg. sh. 5,410 ft.

Red River Parish

Arkansas Fuel Co. No. 1 Frankland Realty Co., NW sec. 20-11-9. Drlg. 6,405 ft.
Glassell & Whitehurst No. 1 LeLong, NE NW NE sec. 25-12-11. Set 13⅜-in. csg. 250 ft.
Yandell Rogers No. 5 Gaspair, SE SW sec. 27-13-11. S.D. 2,330 ft.

Sabine Parish

Hunter Co. No. 2 Long Bell Lbr. Co., C NE NE sec. 23-7-13. Set 6-in. csg. 2,226 ft.; drlg. 2,236 ft.
W. L. Posey No. 1 Hale, C NE NW sec. 12-7-13. S.D. 1,675 ft.
Sutton-Zwolle Oil Co. No. 1 Sabine Lbr. Co., SE cor. NW NE sec. 23-7n-14w. Drlg. 750 ft.

Tensas Parish

H. M. Jones No. 2 Chicago Mill & Ld. Co., NE SW sec. 31-12-10e. Drlg. 720 ft.

Union Parish

Joe Modisett No. 1 Frost Lbr., sec. 14-21-1e. T.D. 7,005 ft.; S.D.

Webster Parish

H. L. Hunt Oil Co. No. 1 Hope, C SW NW sec. 24-21-10. Drlg. 4,390 ft.
Magnolia Pet. Co. No. 1 Crichton Hrs., NE NW sec. 33-21-10. Set 7-in. csg. 8,304 ft.; T.D. 8,332 ft.; comp.; 611 B.P.D. dist.; ⅛-in. ck. and 7,000,000 ft. gas.
Magnolia Pet. Co. No. 7 Marshall, SW SE sec. 21-21-10. Drlg. 8,253 ft.
Magnolia Pet. Co. No. 2 Mixon, sec. 22-21-10. Drlg. 6,510 ft.
Magnolia Pet. Co. No. 1 Sexton Unit, NW SE sec. 32-23-9. Drlg. L.&sh. 5,060 ft.
North American Oil Co. and Root Pet. Co. No. 1 Coyle, NE SW sec. 28-21-10. Drlg. 7,319 ft.
North American Oil Consol. Co. No. 1 Stewart, C SE NE sec. 32-27-10. Set 13⅜-in. 763 ft.; T.D. 2,413 ft.
Ohio Oil Co. No. 2 Bodcaw Acct. 4, SW SE NW sec. 24-21-10. Drlg. 7,164 ft.
Ohio Oil Co. No. 48 Bodcaw Acct. 2, SE sec. 15-21-10. Drlg. 7,488 ft.
Ohio Oil Co. No. 23 Gray Acct. No. 1, SE sec. 27-21-10. Drlg. 6,831 ft.
Ohio Oil Co. No. 2 Warren Cox, SE sec. 23-21-10. Drlg. 7,833 ft.
A. G. Oliphant No. 2 Banks, C SE NW sec. 34-21-10. Drlg. 4,221 ft.
A. G. Oliphant No. 1 Hodges, NW sec. 34-21-10. Top Holloway 5,650-62 ft.; S.D.; W.O. 5,672 ft.
Stanolind O. & G. Co. No. 1 Pardee Co., SW NE sec. 36-21-10. Drlg. 2,334 ft.
Union Prod. Co. No. 4 Miller, SE cor. SE sec. 28-21-10. Drlg. sh. 1,314 ft.
Woodley Pet. Co. No. 5-B M. E. Gray, sec. 27-21-10. Set 7-in. csg. 8,092 ft.; T.D. 8,142 ft.

SOUTH LOUISIANA FIELDS

Anse La Butte—St. Martin Parish

Austin B. Taglar No. 4 Begnaud, sec. 113-9s-5e. T.D. 1,970 ft.; 7-in. csg. 1,916 ft.
Austin B. Taglar No. 1 Martin, sec. 71-13s-9e. T.D. 1,750 ft.; salt 5⅞-in. csg. 1,750 ft.; W.O.C.

Bay St. Elaine—Terrebonne Parish

F. J. LeBlanc No. 2 Wurzlow, sec. 17-22s-18e. S.D. 910 ft.

Bayou Blue—Iberville Parish

Humble O. & R. Co. No. 1 Schwing, sec. 67-9s-11e. Drlg. sh. 6,315 ft.

Bayou Cocotriz—Terrebonne Parish

Shell Pet. Corp. No. 4 Pelican, sec. 19-17s-15e. 10¾-in. csg. 2,452 ft.; cg. sh. 9,475 ft.

Bayou De Allemands—St. Charles Parish

Amerada Pet. Corp. No. 1 St. Charles Ld. Co., sec. 38-15s-20e. 10¾-in. csg. 2,698 ft.; top salt 9,255 ft.; T.D. 9,263 ft.; 7-in. csg. 7,200 ft.; Schlumberger shwd. 7¾ ohms, 130 millivolts; drilled plug; stuck D.S.

Big Lake—Cameron Parish

Union Sulphur Co. No. 2 Miami Corp., sec. 19-12s-8w. R.U.

Black Bayou—Calcasieu Parish

Shell Pet. Corp. No. 39 Watkins. Core sh. 6,394 ft.

Bosco—Acadia Parish

Superior Oil Co.-Pure Oil Co. No. 5 Larcade, sec. 35-8s-3e. T.D. 10,216 ft.; P.B. sdtrkd.; T.D. 9,927 ft.; 9⅝-in. csg. 7,536 ft.; T.D. 10,326 ft.; P.B. 9,423 ft.

Edgerly—Calcasieu Parish

La. Crusader Oil Co. No. 1 La. Prairie, sec. 21-9s-11w. Drlg. L.&sh. 4,210 ft.

Cameron Meadows—Cameron

Burton-Sutton Oil Co. No. 51 Sch. Ld., sec. 16-14s-13w. Drlg. sd.&shells 785 ft.
Magnolia Pet. Co. No. 21 Cameron Meadows, sec. 21-14s-13w. 13⅜-in. csg. 1,173 ft.; 9⅝-in. csg. 4,080 ft.; swbg.

Cheneyville—Rapides Parish

Amerada Pet. Corp. No. 4 Well, sec. 53-1s-2e. Cg. gas sd. 5,655 ft.

Charenton—St. Mary Parish

Pan American Prod. Co. No. 1 Bourdreaux, sec. 21-13s-9e. R.U.
Pan American Prod. Co. No. 1 Eucer, sec. 11-13s-9e. Drlg. sh. 8,873 ft.
Pan American Prod. Co. No. 1-A Kern, sec. 21-13s-9e. R.U.
Pan American Prod. Co. No. 1 Simoneaux, sec. 21-13s-9e. T.D. 3,000 ft.; abd.

Choctaw—Iberville Parish

Louisiana Crusader Oil Co. No. 1 E. B. Schwing, sec. 29-8s-11e. Drlg. sh. 8,642 ft.
Standard Oil Co. No. 8 Gay, sec. 52-9s-11e. Drlg. sh.&L. 5,810 ft.

Darrow—Ascension Parish

Kiva Oil Co. No. 1 Duplessis, sec. 69-10s-2w. R.U.
Humble O. & R. Co. No. 2 Landry, sec. 34-10s-2e. R.U.
Humble O. & R. Co. No. 1 Rose, sec. 33-10s-2e. 10¾-in. csg. 2,966 ft.; T.D. 6,940 ft.; 7-in. csg. 6,924 ft.

Dog Lake—Terrebonne Parish

Texas Co. No. 21 State, sec. 5-22s-16e. Drlg. sdy. sh. 4,583 ft.

Fausse Point—Iberia Parish

Texas Co. No. 4 State, sec. 35-11s-8e. 18⅝-in. csg. 90 ft.; T.D. 6,943 ft.; washing to bttm.

Four Isle—Terrebonne Parish

Texas Co. No. 9 L.L.&E., sec. 24-21s-16e. T.D. 8,553 ft.; P.B. 3,881 ft.; sdtrk.; T.D. 6,943 ft.; cleaned hole to 6,780 ft.; csg. collapsed.

Garden Island—Plaquemines Parish

Texas Co. No. 25 State, sec. 37-23s-33e. Drlg. sh. and sdy. sh. 6,040 ft.

Gillis—Calcasieu Parish

Union Sulphur Co. No. 2 Mary McIvor, sec. 14-9s-8w. T.D. 7,165 ft.; 5-in. csg. 7,165 ft.; P.B. 7,142 ft.; set cmt. retainer; squeezed off perf.; perf. csg. 7,136-38 ft.; run screen and lnr.
Union Sulphur Co. No. 6 Kaufman, sec. 13-9s-8w. Cg. S.W. sd. 7,531 ft.

Hackberry—Cameron Parish

W. T. Burton No. 3 Lewis, sec. 22-12s-10w. R.U.
W. T. Burton No. 2 Porter Ellender, sec. 27-12s-10w. T.D. 4,640 ft.; perf. csg. 3,876-3,909 ft.; swbd. wash wtr.; S.D.
Daryl Davis No. 1 Doiron, sec. 37-12s-10w. S.D. 40 ft.
F. J. LeBlanc No. 1 Doiron, sec. 36-12s-10w. Drlg. sd. 900 ft.
Stanolind O. & G. Co. No. 8 Carter & Sweeney, sec. 22-12s-10w. R.U.
Stanolind O. & G. Co. No. 10 Carter & Sweeney, sec. 22-12s-10w. Drk.
Texas Co. No. 3-B State, sec. 12-12s-9w. T.D. 7,695 ft.; P.B.; sdtrkd.; T.D. 7,534 ft.; perf. csg. 7,490-7,520 ft.; I.P. 382 B.P.D.; ¼-in. ck.
Union Sulphur Co. No. 1 Doiron, sec. 37-12s-10w. T.D. 4,888 ft.; 7-in. csg. 4,876 ft.; drlg. sd.&sh. 4,939 ft.
Union Sulphur Co. No. 43 Watkins, sec. 24-12s-10w. T.D. 4,124 ft.; P.B. 2,385 ft.; to sdtrk.
York Oil Field Supply No. 3 Vincent, sec. 28-12s-10w. T.D. 2,947 ft.; milling on csg.

Horseshoe Bayou—St. Mary Parish

Texas Co. No. 1 St. Mary Parish Ld. Co., sec. 37-17s-9e. Drive piling.

Iowa—Jeff Davis Parish

Magnolia No. 13 Wait, sec. 12-9s-7w. T.D. 4,435 ft.; R.U. to pmp.

Lockport-Cameron Parish

Magnolia Pet. Co. No. 35 Miller, sec. 9-10s-9w. T.D. 7,237 ft.; S.D.

Jeanerette—St. Mary Parish

Herton Oil Co. No. 1 Teche Sugar Co., sec. 58-13s-8e. T.D. 9,890 ft.; 7-in. csg. 9,884 ft.

Jennings—Acadia Parish

W. T. Burton No. 5 Roboria, sec. 42-9s-2w. T.D. 6,842 ft.; rng. csg.
H. Fostiades et al No. 1 Washington-Opelousas, sec. 41-9s-2w. Drlg. sh. 6,650 ft.
Gulf Ref. Co. No. 39 Arnaudit, sec. 47-9s-2w. T.D. 4,840 ft.; run csg.
Jolly Pet. Co. No. 2 McFarlain, sec. 41-9s-2w. Drk.; (corrected).
Jolly Pet. Co. No. 5 Jennings-Heywood, sec. 46-9s-2w. T.D. 2,040 ft.; S.D.
Port City Oil Co. No. 21 Jennings-Heywood, sec. 41-9s-2w. Drlg. sh. 1,610 ft.
Reiter Foster Oil Co. No. 2 Crusel, sec. 42-9s-2w. T.D. 3,908 ft.; P.B. 3,146 ft.; S.D.
Rock Oil Co. No. 3 Gulf Martin, sec. 47-9s-2w. Drlg. sd.&sh. 1,635 ft.
Shell Pet. Corp. No. 3 Community, sec. 40-9s-2w. T.D. 7,131 ft.; perf. csg. 7,085-95 ft.; pulling tbg.
Stanolind O. & G. Co. No. 19 Houssiere-Latrelle, sec. 47-9s-2w. T.D. 6,448 ft.; rmg.
Superior Oil Co. No. 1 Julis Clement, sec. 46-9s-2w. T.D. 7,324 ft.; D.S. stuck.
Superior Oil Co. No. 3 Iowa-Jennings, sec. 41-9s-2w. Drlg. sh. 4,862 ft.
Superior Oil Co. No. 5 Jennings-Heywood, sec. 41-9s-2w. Drlg. sh. 6,448 ft.
Superior Oil Co. No. 9 Leckelt, sec. 42-9s-2w. Drlg. sh. 6,720 ft.
Victor Weisse No. 1 Clement, sec. 46-9s-2w. Top salt 3,819 ft.; T.D. 3,938 ft.

Lafitte—Jefferson Parish

Texas Co. No. 9 Lafitte, sec. 20-17s-24e. Drlg. sh. 8,871 ft.
Texas Co. No. 1 Marrero Land & Investment Co., sec. 20-17s-24e. 13⅜-in. csg. 1,937 ft.; drlg. sh.&L. 8,948 ft.

Lake Hermitage—Plaquemines Parish

Gulf Ref. Co. No. 7 Lafourche, sec. 12-18s-25e. 7-in. csg. 8,074 ft.; cg. sh. 9,590 ft.

Lockport—Calcasieu Parish

Magnolia Pet. Co. No. 35 Miller, sec. 9-10s-9w. S.D. 7,237 ft.

Lake Long—Lafourche Parish

Fohs Oil Co. No. 2 State, sec. 65-17s-19e. R.U.
Fohs Oil Co. No. 3 State, sec. 65-17s-19e. 10¾-in. csg. 2,743 ft.; T.D. 9,539 ft.; sd. 9,517-33 ft.; P.B. 9,464 ft.; perf. csg. 9,482-96 ft.; drlg. sh. 10,523 ft.

Leesville—Plaquemines Parish

Texas Co. No. 63 Leesville, sec. 27-12s-22e. Drlg. sdy. sh. 2,959 ft.

Lirette—Terrebonne Parish

Humble O. & R. Co. No. 1 Frank Wurzlow, sec. 6-19s-19e. 13⅜-in. csg. 2,796 ft.; cored sd. and sh. show. oil 8,215-25 ft.; T.D. 9,027 ft.; run 7-in. csg. 70 ft. well tried to blow out after drlg. plug; drlg. sh. 9,084 ft.

New Iberia—Iberia Parish

Wm. Hellis No. 4 Gulf Land, sec. 52-12s-7e. Drlg. sdy. L. 4,763 ft.
Wm. Hellis No. 10 Bernard, sec. 54-12s-7e. R.U.
Texas Co. No. 3 Bryant, sec. 25-12s-7e Cg. sd. 4,724 ft.
Texas Co. No. 1 Burke, sec. 56-12s-8e. T.D. 7,383 ft.; sdtrkd.; cg. 7,151 ft.

North Crowley—Acadia Parish

Humble O. & R. Co. No. 1 Daly, sec. 44-8s-1e. T.D. 2,045 ft.; run 10¾-in. csg.
Humble O. & R. Co. No. 2 Ohlenforst, sec. 34-8s-1e. Drlg. sh. 5,551 ft.

Roanoke—Jeff Davis Parish

Humble O. & R. Co. No. 5 Taylor, sec. 12-9s-4w. Drlg. sdy. L. 8,292 ft.

Sorrento—Ascension Parish

Sorrento Oil Co. No. 1 L. L. Barnard et al, sec. 16-10s-4e. 10¾-in. csg. 1,070 ft.

South Elton—Jeff Davis Parish

Stanolind O. & G. Co.-Amerada Pet. Corp. No. 3-B Calcasieu Natl. Bank, sec. 2-7s-3w. T.D. 9,154 ft.; recmtd. surf. csg. W.O.C.

Starks—Calcasieu Parish

Capital Oil Co. No. 1 Lutcher-Moore, sec. 24-9s-13w. R.U.
Lutcher Moore No. 3 fee, sec. 19-8s-12w. T.D. 4,361 ft.; 6⅝-in. csg. 4,351 ft.; drld. deeper; T.D. 4,367 ft.; R.U. to pmp.
J. R. Turnbull et al No. 3 Industrial Lbr. Co., sec. 19-9s-12w. T.D. 2,400 ft.; 7-in. csg. 2,378 ft.; W.O.C.

Sulphur—Calcasieu Parish

Union Sulphur Co. No. 852 fee, sec. 29-9s-10w. Cg. sdy. sh. 4,976 ft.
Union Sulphur Co. No. 855 fee, sec. 20-9s-10w. T.D. 4,272 ft.; 7-in. csg. 4,239 ft.

Tepetate-Acadia Parish

Continental Oil Co. No. 4-D Homeseekers Dev. Co., sec. 34. T.D. 8,313 ft.; pulling screen and lnr. to reset.

Valentine—Lafourche Parish

Pan American Prod. Co. No. 15 Harang, sec. 8-17s-20e. 16-in. 210 ft.; T.D. 7,08 ft.; P.B. 3,343 ft.; T.D. 6,138 ft.; run 7-in. csg.; I.P. 300 B.P.D.; ½-in. ck.
Pan American Prod. Co. No. 15 Harang, sec. 5-17s-20e. Drlg. sh. 2,750 ft.
Pan American Prod. Co. No. 16 Harang, sec. 7-17s-20e. R.U.

Venice—Plaquemines Parish

Tide Water Oil Co. No. 5 Manhattan Fruit Co., sec. 26-26s-30e. Drlg. 2,830 ft.

Vinton—Calcasieu Parish

Katina Oil Co. No. 2 Vincent, sec. 34-10-12w. T.D. 4,303 ft.; P.B. 3,227 ft.; swbd. oil and S.W.; S.D.
M. McLean No. 17 Gray, sec. 35-10s-12w. R.U.
J. V. Redick No. 1 Vincent, sec. 34-10s-12w. Drlg. 916 ft.
Superior Oil Co. No. 2 Gray, sec. 4-11s-12w. Drlg. sh. 4,234 ft.
Superior Oil Co. No. 2 Levy, sec. 4-11s-12w. T.D. 5,790 ft.; P.B. 2,000 ft.
Sutton-Burton No. 1 Calcasieu Natl. Bk., sec. 3-11s-12w. T.D. 4,500 ft.; S.D.

Villa Platte—Evangeline Parish

Continental Oil Co. No. 1 La. Ld. Improvement Co., sec. 46-3s-2e. 18⅝-in. csg. 247 ft.; drlg. sh. 7,936 ft.

Welsh—Jeff Davis Parish

Stanolind O. & G. Co. No. 1 W. B. Conover, sec. 20-9s-5w. Drk.

White Castle—Iberville Parish

T. D. Humphray No. 1 E. B. Adams, sec. 1-11s-12e. S.D. 6,067 ft.; P.B. and sdrkd.; T.D. 8,840 ft.; washing over D.P.
Shell Pet. Corp. No. 11 Wilbert, T.D. 6,900 ft.; P.B. 6,800 ft.; perf. 6,780-95 ft.; showed P.L.O. on D.S.T.

S. LOUISIANA WILDCATS

Acadia Parish

H. E. Dalton No. 1 Setting, sec. 17-7s-1w. T.D. 5,106 ft.; P.B. to approx. 500 ft.; T.D. 3,925 ft.; D.S. stuck.
Gulf Oil Corp. No. 1 Euclia Broussard, sec. 49-10s-2w. T.D. 9,678 ft.; 7-in. csg. 9,672 ft.; cg. sh. 9,860 ft.

Calcasieu Parish

Republic Prod. Co. No. 1 Sabine Tram. Co., sec. 25-18s-14w. 10¾-in. csg. 1,981 ft.; T.D. 9,620 ft.; hole clean; S.D.; high wtr.
Union Sulphur Co. No. 1 American Oil & Sulphur Co., sec. 16-10s-10w. T.D. 8,002 ft.; abd.
Wheeler Oil Corp. No. 2 Sch. Ld., sec. 16-9s-7w. 15½-in. csg. 46 ft.; W.O.C.

Cameron Parish

Humble O. & R. Co. No. 1 Miami Corp., sec. 8-14s-5w. 20-in. pipe set 188 ft.; 9⅝-in. csg. 7,100 ft.; T.D. 10,177 ft.; D.S. stuck; P.B. 8,155 ft.; sdtrkd.; T.D. 8,499 ft.; D.S. stuck.

Cameron Parish—Gulf of Mexico

Superior Oil Prod. Co. et al No. 1 State-Gulf of Mexico, 3,800 ft. W, 6,200 ft. S of SE cor. of irregular sec. 4-15s-8w. 10¾-in. csg. 1,157 ft.; T.D. 7,166 ft.; 7⅝-in. csg. 7,166 ft.; drlg. sh. 8,620 ft.

East Baton Rouge Parish

Cavalier Oil Co. No. 1 Elliott, sec. 3-9s-2e. T.D. 7,678 ft.; S.D.

Evangeline Parish

Schlicher Prod. Co. No. 2 Ledenois, sec. 35-3s-1w. 10¾-in. csg. 250 ft.; drlg. sd. 410 ft.

Iberia Parish

Texas Co. No. 2-B Vermilion Bay, sec. 20-16s-5e. T.D. 9,101 ft.; P.B. and sdtrkd. at 5,788 ft.; drlg. sd. 6,748 ft.

Jefferson Parish

Triangle Oil Co. No. 1 Conroe, sec. 125-12s-11e. T.D. 3,752 ft.; D.S. stuck.

Jefferson Davis Parish

Continental Oil Co. No. 1 Faye, sec. 31-10s-3w. 10¾-in. csg. 1,999 ft.; T.D. 10,935 ft.; well blew out; stuck D.S.

Union Sulphur Co. No. 1 Caicasieu National Bank, sec. 12-9s-6w. T.D. 8,524 ft.; 7-in. csg. cmtd. 8,524 ft.; P.B. T.D. 8,310 ft.; tstd. S.W. through perforations 8,292-95 ft.; perf. csg. 8,276-81 ft.; I.P. 46 bbls. distl. per day through 29/64-in. ck. on tbg. and 12/64-in. bttm-hole ck.; killed well; squeezed off perf. 8,276-81 ft.; W.O.C.

Lafourche Parish

Amerada Pet. Corp. No. 1 South Coast Corp., sec. 34-15s-19e. T.D. 8,745 ft.; 9⅝-in. csg. 7,636 ft.; cored O.S. 10,209-14 ft.; cored 10,219-24 ft.; recovered 3 ft. O.S., 2 ft. S.W. sd.; T.D. 10,314 ft.; 7-in. csg. 9,003 ft.; will run 5-in. csg. to bttm.

Gulf Oil Corp. No. 3 State (P.P.), sec. 35-23-21. T.D. 8,728 ft.; salt; P.B. to perf. csg.; perf. csg. 6,935-62 ft.; flwd. P.L.O.; sanded up; swbg.

St. Bernard Parish

Gulf Oil Corp. No. 2 State Lake Borgne, sec. 38-14s-15e. 13⅜-in. csg. 303 ft.; T.D. 3,461 ft.; 7-in. csg. 3,461 ft.; T.D. 5,102 ft.; abd.

St. Martin Parish

Shell Pet. Corp. No. 1 Fredericks, sec. 38-8s-5e. Drlg. sdy. L. 9,239 ft.

Shell Pet. Corp. No. 1 Unit, sec. 11-14s-12e. Drlg. sdy. sh. 6,453 ft.

Texas Co. No. 4 State Lake Mongoulois, sec. 14-10s-9e. Drlg. sdy. sh. 4,965 ft.

St. Mary Parish

Shell Pet. Corp. No. 1 Barbour, sec. 21-15s-12e. T.D. 10,417 ft.; abd.

Terrebonne Parish

Fohs Oil Co. No. 1 Buckley & Bourg, sec. 77-19s-17e. Bldg. drk.

TEXAS

Week Ending January 15

GULF COAST FIELDS

Lockridge—Brazoria County

Gulf Oil Corp. No. 3 Gibson, J. W. Hall Sur. Drk.

Gulf Ref. Co. No. 3 Reiss, J. W. Hall Sur. T.D. 6,368 ft.; 7-in. csg. 6,368 ft.; S.G. &S.W.; P.B. 6,344 ft.; tstg.

Shell Pet. Corp. No. 4-B Ramsey, J. W. Hall Sur. R.U.

Hastings Field—Brazoria County

Humble O. & R. Co. No. 5 Alexander, H.T.&B. Sur. No. 28. Drlg. 1,537 ft.

Humble O. & R. Co. No. 5 McDeed, H. T.&B. Sur. No. 27. T.D. 6,080 ft.; W.O.C.

Senisa Oil Co. et al No. 1 B. Steiner & Blummer, H.T.&B. Sur. No. 28. Drlg. hd. sd. 4,687 ft.

Stanolind O. & G. Co. No. 7 R. L. Autrey, H.T.&B. Sur. No. 37. Drk.

Stanolind O. & G. Co. No. 7 T. C. Edwards, Wm. Henry Sur. Drlg. sh. 4,315 ft.

Stanolind O. & G. Co. No. 1 Geo. Liverman, H.T.&B. Sur. No. 28. Drlg. sh. 2,537 ft.

Stanolind O. & G. Co. No. 1 C. W. Massey, H.T.&B. Sur. No. 37. R.U.

Sam E. Wilson No. 1 E. D. Mills, I.& G.N. Sur. No. 23. Drlg. sh. 5,737 ft.

Old Ocean—Brazoria County

Harrison & Abercrombie No. 2 Armstrong, Polly & Chance Sur. T.D. 10,856 ft.; 7-in. csg. 10,824 ft.; tstg.

Harrison & Abercrombie Oil Co. No. 1 Troyer and West Texas Abst. Co., C. Breen Sur. Loc.

West Columbia—Brazoria County

Sterling Oil & Ref. Co. No. 1 Powers et al, Geo. Tennille Sur. Drlg. 2,339 ft.

Texas Co.-Sterling O. & R. Co. No. 6 Phillips, G. Tennille Sur. Drlg. sh.&L. 3,137 ft.

Texas Co. No. 1 T. Robinson, George Tennille Sur. Drlg. sh. 3,550 ft.

Texas Co. No. 3 Smith, G. Tennille Sur. Drlg. sh. 5,448 ft.

Calhoun—Heyser—Victoria County

Blanco Oil Co. and Buchanan No. 4 C. S. Dunnwoody, A. Sisneros Sur. Cg. 5,430 ft.

Blanco Oil Co.-Buchanan No. 6 C. Dunwoody, A. Sisneros Sur. T.D. 5,498 ft.; comp.; no ga.

George Echols No. 7 W. H. Bennett, J. E. Galban Sur. T.D. 5,746 ft.; 7-in. csg. 5,743 ft.

Gulf Oil Corp. No. 2 L. P. Schultz, J. E. Galban Sur. Bldg. drk.

Gulf Ref. Co. No. 2-B Traylor, J. E. Galban Sur. Cg. 5,644 ft.

Humble O. & R. Co.-Plymouth Oil Co. No. 1 Vandeberg, J. Galban Sur. T.D. 6,033 ft.; P.B. to 5,600 ft.; tstg.

Humble O. & R. Co.-Plymouth Oil Co. No. 16 E. H. Welder, J. M. Rios Sur. T.D. 5,480 ft.; 7-in. csg. 5,475 ft.

Humble O. & R. Co. No. 18-B P. H. Welder, A. Sisneros Sur. R.U.

Sinclair Prairie Oil Co. No. 8 W. H. Bennett, A. Sisneros Sur. Spd.

Sun Oil Co. No. 5 Coffey, J. E. Galban Sur. Drlg. sh. 4,996 ft.

Seabreeze—Chambers County

Sun Oil Co. No. 1 R. J. Barrow, A. Yarbo Sur. R.U.

Sun Oil Co. No. 1 Seabreeze Ld. Co., H.T.&B. Sur. 102. R.U.

Silsbee—Hardin County

Republic Prod. Co.-Houston Oil Co. No. 2 Ellery fee, J. Ellery Sur. Drk.

Republic Prod. Co.-Houston Oil Co. No. 1 Howell, Geo. W. Brooks Sur. 7-in. csg. 6,848 ft.

Clinton—Harris County

Stanolind O. & G. Co. No. 1 Moody, Reel & Trobough Sur. T.D. 3,700 ft.; 5¾-in. csg. 3,669 ft.; perf. csg. 3,602-05 ft.; showing gas and S.W.

Friendswood—Harris County

Humble O. & R. Co. No. 2 E. A. Gray, Perry & Austin Sur. T.D. 1,026 ft.; W.O.C.

Humble O. & R. Co. No. 1 Holdale-Forster, Perry & Austin Sur. Cg. 5,960 ft.

Humble O. & R. Co. No. 1 J. L. Jones and E. A. Gray, Perry and Austin Sur. Drk.

Humble O. & R. Co. No. 1 Kiesling, T. Choate Sur. R.U.

Humble O. & R. Co. No. 2 A. E. Keisling et al, T. Choate Sur. T.D. 1,048 ft.; 10¾-in. csg. 1,015 ft.

Humble O. & R. Co. No. 1 Pierce, W. K. Smith Sur. Drlg. 5,186 ft.

North Cheek—Jefferson County

Magnolia Pet. Co. No. 3-A Phelan, S. Stevers Sur. Crooked hole; P.B.

Hardin—Liberty County

Atlantic Ref. Co. No. 1 Wm. McMurtry, H. B. Johnson Sur. Drlg. sh. 6,310 ft.

Atlantic Ref. Co. No. 1 Murphy, H. B. Johnson Sur. 10¾-in. csg. 1,981 ft.; T.D. 7,610 ft.; 7-in. csg. 7,591 ft.

Jack Frazier No. 2 B. F. Hanchey, H. B. Johnson Sur. Drk.

Jack Frazier No. 1 W. McMurtry, H. B. Johnson Sur. R.U.

Gulf Oil Corp. No. 1 J. H. Cessna, H. B. Johnson Sur. Drk.

Halliburton Oil Prod. Co. No. 1 Hanchey, H. B. Johnson Sur. R.U.

Humble O. & R. Co. No. 2 Myrtle Chambers, A. B. Hardin Sur. T.D. 7,580 ft.; comp.; no ga.

Humble O. & R. Co. No. 1 Partlow, H. B. Johnson Sur. Spd.

Sun Oil Co. No. 1 Cessna, A. B. Hardin Sur. T.D. 7,544 ft.; comp.; no ga.

E. W. Wickes No. 1 Tullos, H. B. Johnson Sur. Drlg. sh. 5,659 ft.

South Call—Newton County

Houston Oil Co. No. 3 Peavy Moore Lbr. Co., sec. 42, H.&T.C. Sur. Drlg. sh. 4,137 ft.

Bay City—Matagorda County

Hamman Explo. Co. No. 2 Thompson, E. Hall Sur. Spd.

Pan American Prod. Co. No. 1 Richers, I.&G.N. Sur. X-3. R.U.

Buckeye—Matagorda County

United North & South Development Co. No. 1 G.B.M., Cotton Lge. 7-in. csg. 8,667 ft.; T.D. 10,500 ft.; hole cleaned; W.O.O.; P.B. to 7,300 ft. to sdtrk.

Palacios—Matagorda County

Atlantic Ref. Co. & McCarthy No. 3 Foley Ld. Co., L. Goodwin Sur. Cg. sh. 7,756 ft.

Sun Oil Co. No. 1 Bay Shore Farms, Lewis Goodwin Sur. T.D. 11,327 ft.; 7-in. csg. 11,300 ft.; perf. csg. 9,800-25 ft.; squeezed cmt. behind csg.; perf. csg. 9,245-75 ft.; well blew out, caught fire; flwg. oil, gas and some S.W.; fire extinguished; well flwg. 250 bbls. dist. per day.

Orange—Orange County

Gulf Oil Corp. No. 1 Orange National Bk., Wm. Dyson Sur. T.D. 1,657 ft.; run 10¾-in. csg.

Glenn H. McCarthy No. 2 Brown, S. M. Luce Sur. Drlg. sh. 2,630 ft.

Union Prod. Co. No. 2 Lutcher-Moore Dryson Sur. P.B. to 3,500 ft. to straighten hole.

Segno—Polk County

Gulf Oil Corp. No. 2 Ragan, I.&G.N. Sur. 15. Cg. sh. 5,175 ft.

Gulf Oil Corp. No. 9 Sarah Wing, I.& G.N. Sur. No. 15. R.U.

Spurger—Tyler County

Republic Prod. Co. No. 7 Hurd, N. Hurd Sur. Drlg. sh. 5,768 ft.

Keeran Field—Victoria

Union Oil Co. No. 8 Keeran Est., M. De-Leon Sur. T.D. 6,512 ft.; P.B. 5,550 ft.; perf. csg. 5,518-26 ft.; tstd. S.W.

GULF COAST WILDCATS

Brazoria County

Pure Oil Co. No. 1 Smith, S. F. Austin Sur. S.D. 7,710 ft.; abd.

Texas Co. No. 4 Freeport Sulphur Co., C. Arriola Sur. 10-in. csg. 1,214 ft.; T.D. 3,900 ft.; P.B. 2,564 ft.; sdtrkd.; T.D. 3,000 ft.; P.B. to sdtrk.

Chambers County

Standard Oil Co. of Texas and California Oil Co. No. 1 State Galveston Bay. Spd.

Colorado County

Coyle-Concord No. 1 Hancock-Broussard. Hill Duffner Sur. 10¾-in. csg. 1,098 ft.

Fort Bend County

Medford and Burke No. 1 M. T. Wood, S. M. Stevens Sur. T.D. 6,516 ft.; abd.

Harris County

Amerada Pet. Corp.-Stanolind O. & G. Co. No. 1 Mills, A. Larson Sur. T.D. 6,863 ft.; S.W. sd.; 7-in. csg. 6,859 ft.; perf. csg. 6,838-52 ft.; I.P. 24 B.P.H.; ¼-in. ck.

W. S. Howell No. 1 Root, A. McCormick Sur. Drlg. sh. 1,638 ft.

Jackson County

Magnolia Pet. Co. No. 1 West Ranch, R. Musquez Sur. Drlg. sh. 3,896 ft.

Jefferson County

I. E. Harwell No. 1 State, Gulf of Mexico. Spd.

Glenn McCarthy No. 1 J. E. Broussard, C. Hilibrand Sur. T.D. 7,732 ft.; recvd. 29 thribbles of oil, 4 thribbles of S.W. 7-in. csg. on bttm.; perf. csg. 7,730-32 ft.; rec. 1,750 ft. oil, 250 ft. S.W.; squeezed off perfs.; W.O.C.; perf. csg. 7,718-27 ft.; flwg. 6 bbls. fluid per hr., 40% brksh. wtr.

Matagorda County

Pierce Estate No. 1 Pierce, I.&G.N. Sur. No. 7. T.D. 7,374 ft.; P.B.; will sdtrk. and core 6,626-32 ft.

Sun Oil Co. No. 1 Fred Robbins, C. H. Vandeveer Sur. Drlg. sh. 8,812 ft.

Polk County

C. E. Gates No. 2 I. O. Jackson, J. W. Abbey Sur. Spd.

Trinity County

J. R. Bunn No. 1 Rock-Creek Lbr. Co., John Crew Sur. T.D. 4,012 ft.; abd.

S. T. Walker et al No. 1 First State Bk. 10¾-in. csg. 150 ft.; no report.

Tyler County

Navarro Oil Co. No. 1 Wm. Rice, sec. 11, B.B.B.&C. Sur. T.D. 5,189 ft.; abd.

Waller County

C. W. Markel et al No. 1 Hall, B. B. Guerrgnd Sur. No. 261. R.U.

Stanolind O. & G. Co. No. 1 Security Trust Co., H.&T.C. Sur. T.D. 7,526 ft.; 7-in. csg. 7,526 ft.; perf. csg. 7,408-13 ft.; tstd. S.W. and gas.

Wharton County

Strake Pet. Co. No. 1 Strunck, L. P. Jennings Sur. Drlg. sh. 8,339 ft.

S. W. TEXAS WILDCATS

Atascosa County

L. W. Steiren No. 1 Crawford, 4 mi. W of Anchorage. T.D. 3,880 ft.; prep. to P.B. and test Austin chalk.

Bastrop County

J. W. Bibb No. 1 Lentz, F. Wilkenson Sur Top Austin Chalk with odor of oil 2,530 ft.; T.D. 2,514 ft.; 5½-in. csg. 2,443 ft.

J. I. Collins No. 1 J. C. Lofton, A. J. Denson Sur. R.U.

Southern Cross Oil Co. No. 1 Smith, James B. Blalock Sur. S.D. 2,189 ft.

Bee County

H. E. Pressy No. 1 F. H. Pressy, C. Williams Sur. Drlg. 45 ft.

Bexar County

R. W. Fair No. 1 San Antonio Subd., J. H. Pickens Sur. 10-in. csg. 40 ft.; cd. L.; oil show 1,150-90 ft.; 7-in. csg. 1,140 ft.; bailed dry; will treat with acd.

Hikok & Reynolds No. 1 Elvert, Thomas York Sur. S.D. 445 ft.

Chas. Persyn No. 1 fee, Wm. Lindsey Sur. Drlg. 735 ft.

Caldwell County

Mac-Wag-Tree Oil Co. No. 1 Roberts, W. House Sur. Drlg. L. 2,315 ft.; (cor.).

Cameron County

Saxet Prod. Co. No. 1 Port Isabel Irrig. Co. Sur. 30. Drk.

De Witt County

Caldaboard Corp. No. 2 Afflerbach, I. W. Criswell Sur. Drlg. 40 ft.

F. A. Hines No. 1 Boothe, Jas. Swindel Sur. S.D. 141 ft.

D. M. Richardson No. 1 McCurdy, John C. Hunt Sur. T.A.

Dimmitt County

Teas & Maryland Corp. No. 1 McKnight, Blk. 13, sec. 23. Base of Austin Chalk 5,201 ft.; drlg. Del Rio clay 5,988 ft.

Duval County

Circle Oil Co. et al No. 1 Southland Life Ins. Co., Santos Flores Gr. No. 25. Drlg. sh. 3,612 ft.

Gillespie & Sons No. 1 Hamilton, J. Poitevent Sur. No. 85. 10¾-in. csg. 101 ft.; W.O.C.

Karney Gravis No. 1 Frederick, J. H. Gibson Sur. T.D. 1,056 ft.; 5½-in. csg. 1,049 ft.; swbd. S.W.; deepened 1,221 ft.; abd.

James Hougen No. 1 Patton, Sur. No. 148. T.D. 5,002 ft.; cutting side wall cores.

Magnolia Pet. Co. No. 1 Duval County Ranch Co., G.B.&N.C.R.R. Sur. No. 61. T.D. 3,672 ft.; abd.

Magnolia Pet. Co. No. 1 A. Lopez, M. Lopez Sur. No. 82. Cg. 5,387 ft.

Edwards County

Amon G. Carter No. 1 Sweeten, SE¼, Blk. 2, Sur. 49. T.D. 5,111 ft.; 9-in. csg. 5,030 ft.; drlg. sh. 5,511 ft.

Dan Auld No. 1 Henderson, sec. 46, Blk. E. 7-in. csg. 1,865 ft.; S.D. 3,190 ft.

C. V. Lyman No. 1 Brown, Blk. 3. O.W. D.D.; T.D. 3,001 ft.; cleaning out hole.

Frio County

Pagenkopf & Jamieson No. 1 Houston Est., 2,254-ac. tr., J. Figuerroa Sur. S.O. 2,610-03 ft.; set csg. to test 7-in. at 2,480 ft.; swbg.; S.O.&G. and wash wtr.; T.D. 2,651 ft.; set csg.; P.B. 2,607 ft.; pmpg. 30 bbls. fluid per day, 60 per cent oil; fluid increasing; S.D.; will probably W.O.

Goliad County

Standard Oil Co. of Texas No. 1 Williams, Mieajah Williams Sur. 10¾-in. csg. 436 ft.; T.D. 4,690 ft.; abd.

Dual Swiger No. 1-B Wood, J. Shearn Sur. T.D. 5,048 ft.; S.W. sd.; oil sd. 5,044-48 ft.; perf. csg. 5,008-25 ft.; swbd. S.W.; set retainer 5,000 ft.; squeezed off perf.; reperf. csg. 5,009-14 ft.; recvd. 45 bbls. of oil; swbg.; may be P.O.P.

Guadalupe County

Kreiger & Douglass No. 1 Oliver, R. Smith Sur. S.D. 2,363 ft.

Henry W. Whitehall, Tr., No. 1 Rosenbrock, Vincente Duran Sur. Abd. loc.

Hidalgo County

Atlantic Ref. Co. No. 1 American Rio Grande. 7-in. csg. 8,505 ft.; T.D. 9,104 ft.; 5-in. csg. on bttm.; perf. csg. 8,998-9,005 ft.; flwg. dist. and wash wtr.; tstg.

Jim Hogg County

W. L. Stephens et al No. 1 Grey, Simon De Hinojosa Gr. Drk.

Jim Wells County

H. M. Hill et al No. 1 Kuether, Lots 70 and 75, sec. 52, Haldeman Subd. S.D. 3,342 ft.

H. H. Howell et al No. 1 Goldapp, Jose Maria Garcia Sur. R.U.

Howell et al No. 1 Talbot, 181-ac. tr., Lavaca Gr. T.D. 6,012 ft.; P.B. 5,179 gas, some oil; reperf. csg. 3,317-22 ft.; swbg.; showing S.W.; squeezed off perf. 3,600-07 ft.; flwg. small amt. of gas; no ga.

Pan American Prod. Co.-Southern Minerals Corp. No. 1 Hawkins, San Diego De Abajo Gr. 10-in. csg. 525 ft.; cg. sh. 4,857 ft.

Ramsey & Holk No. 1 Robert Adams, T.&N.O. Sur. No. 19. Loc.

Karnes County

DeGraffe & Reele No. 1 Cochran, Daniel B. McConnell Sur. T.D. 1,401 ft.

Kleberg County

Cinco Oil Co. No. 1 Killam, Lot 8, Blk. 53, Kleberg Town & Imp. Co. Subd. S.D. 1,410 ft.

Magnolia Pet. Co. No. 1 Dietz, Gabriel Trevino Sur. 13⅜-in. csg. 1,220 ft.; drlg. sh. 5,800 ft.

Pure Oil Co. et al No. 1 State Ld., Tr. 68, Laguna Madre Bay, Lse. No. 528. Dredging canal.

LaSalle County

Ralph B. Reed No. 1 Yeager, Blk. 7, Sec. 8, Wallace Subd., Yeager ranch. S.D. 1,320 ft.

Lee County

Jas. E. Pederson No. 1 Turner, David Hudson Sur. S.O.&G. 6,140-80 ft.; sdtrkd. at 4,600 ft. and drld. to 6,132 ft.; S.O.&G.; set csg. 6,021 ft.; acdzg. with 20-bbl. load; when opened well flwd 20-bbl. head and went dead; swbd. oil and wtr.; acd.; pulling tbg. to rework and wtr.; acd.; S.D.

Eleoussa Oil Co. No. 1 Sanders, J. Vin Roeder Sur. S.D. 3,995 ft.

Live Oak County

James Chew No. 1 Alma McNeil, Alexander Parks Sur. Drlg. sh. 3,729 ft.

Harvey & Henderson No. 1 Nichols, Thomas Henry Sur. S.D. 40 ft.

Loma Oil Co. No. 1 Striddle. Drlg. 40 ft.

Ray L. Martin No. 1 Adams, J. Buchannan Sur. S.D. 178 ft.

Ranco Oil Corp. No. 1 Cook Ranch sec. 3, J. Poitevent Sur. S.D. 3,900 ft.

V. G. Schimmel No. 1 West, sec. 59, Haas Sur. R.U.

Milam County

Texedo Oil Co. No. 1 Graham, Charles Cronea Sur. Drlg. 175 ft.

Texedo Oil Co. No. 1 Paul Garves, C. Robertson Sur. Drlg. Pecan Gap 475 ft.

McMullen County

Cities Service Oil Co. No. 1 O. E. Morris, Maria Del Pillar Perieda Sur. R.U.

Covle & Bedwell No. 1 Two Rivers Rnch. Co., sec. 60. S.D. 650 ft.

Duncan Drlg. Co. No. 1 Martin Henry, sec. 6. S.D. 707 ft.

Mills Bennett Prod. Co. No. 2 Nueces Ld. & Cattle Co., Sur. No. 234. Drlg. sh. 1,521 ft.

Richardson & McCarthy No. 2 Martin. Sur. No. 7. S.D. 525 ft.

Rowan and Nichols No. 2 Rhodes, H.& ft.

Medina County

M. L. Walker No. 1 Riff, Hans Sur. No. 43. T.D. 1,080 ft.; abd.

Nueces County

Renwar Oil Co. No. 1 C. McKenzie, B. S.&F. Sur. No. 419. Spd.

Renwar Oil Co. No. 1 Morgan, A.B.& M. Sur. R.U.

Richardson Pet. Co. No. 1 Chapman, sec. 43, Laureles Farm Tr. No. 43. Drlg. sh. 6,173 ft.

Union Prod. Co. No. 1 Simmons, 1,000-ac.

tr., Agua Dulce Gr. T.D. 8,021 ft.; fsg.

Refugio County

Continental Oil Co. No. 1 Scott Hrs., Dona A. Reogas Sur. R.U.
Hogan Oil Co. No. 1 Kelley, M. & A. Roache Sur. T.D. 6,437 ft.; P.B. 6,002 ft.; squeezed off perf. 5,995-6,002 ft. W.O.C.

San Patricio County

A. L. Bob No. 2 Green, T. T. Williamson Sur. S.D. 6,554 ft.
Conroe Drlg. Co. No. 1 J. R. Daugherty, Jas. McGloin Sur. Drlg. sh. 3,027 ft.
Plymouth Oil Co. No. 1 Brigham, Geo. H. Paul Subd. Drlg. sdy. sh. 4,272 ft.
F. B. Schwab No. 1 Smith, Juan Hart & Sons Sur. Cd. sd.; odor oil and gas, 5,291-5,301 ft.

Starr County

J. L. Collins No. 1 Francisco B. Guerra, Santa Cruz Gr. Spd.
Dodd Tr. No. 1 Wardner, Vela Sur., Porc 84. S.D. 1,265 ft.
W. W. Ely No. 1 M. G. Gonzales, Portion 70. Run csg. to test; cd. oil sd. 751 ft.; cd. gas sd. 1,010-20 ft.
Transwestern Oil Co. and Davenport No. 3 Slick, sec. 527. T.D. 6,862 ft.; rec. all but 75 ft. pipe; S.D.

Travis County

C. A. Montgomery No. 1 Lundgren, Lemuel Kimbro Sur. Drlg. 850 ft.

Victoria County

W. V. Bowles No. 2 Robertson, T. C. Burnham Sur. R.U.
Geo. Echols No. 1 Dunseth, Frances Perez Sur. Drlg. sh. 5,330 ft.; no report; "tight well."

Webb County

Boysen & Jones No. 1 Watkins, San Casimero Gr. R.U.
Bridwell Oil Co. No. 1 Billings, Sur. 36. 10-in. csg. 40 ft.; drlg. sh. 2,212 ft.
Lemp Oil Co. No. 1 Clark, 500-ac. tr., Porc. 33. Abd. 1,345 ft.

Willacy County

Magnolia Pet. Co. No. 1 Armendaiz, San Juan DeCarricitos Gr., Sh. 4. Drlg. sh. 7,820 ft.

Wilson County

Pattico Oil Co. No. 1 Keller, Karnes Co. Sch. Ld. Sur. S.D. 1,235 ft.

Zapata County

Henry Brown No. 1 Juan Gutierrez Charco De La Indian Gr. S.D. 1,040 ft.
J. W. Edwards No. 1 Garza, El Zoro ranch, Comitas Gr. Loc.

S. W. TEXAS PROVEN

Batesville—Zavalla County

Wilcox O. & G. Co. No. 2 Gillam, G.W.T &P.R.R. Sur. T.D. 3,977 ft.; P.B. 3,958 ft.; treated with acid: swbg. sulfur wtr.; P.B. 3,958 ft.; perf. csg. 3,918-45 ft.; swbd. dry; S.D.

EAST TEXAS

(Border Counties)

Cass County

V. A. Hughes & Co. No. 1 Lyster, Bateman Sur. Cg. 1,921 ft.
Union Prod. Co. No. 5 Bangus Unit, Tromwell Sur. Stg. 9⅝-in. csg. 2,370 ft.

Bowie County

V. A. Hughes & Co. No. 1 Lysted, Wm. Bateman Sur. S.D. 1,913 ft.
King Oil Co. No. 1 Ames, J. A. Tolbott Sur. Drlg. 2,603 ft.
Union Prod. Co. No. 3 Bangus Unit, Tromwell Sur. T.D. 6,044 ft.; drlg. plug.

Harrison County

Ark.-La. Gas Co. No. 1 C. M. Abney, E. Little Sur. T.D. 4,820 ft.; circulating.

Marion County—Rodessa

Arkansas-Louisiana Gas Co. No. 1 Holland, Hanks Sur. Drk.
Geo. Barham No. 2 Brantley, Bennington Sur. Drlg. 3,108 ft.
Fohs Oil Co. No. 1 Henderson, Ewing Sur. Drlg. 5,281 ft.
Fohs Oil Co. No. 1 Kemper, Bennington Sur. 7-in. csg. 6,077 ft.; T.D. 6,092 ft.
Gulf Oil Corp. No. 1 Beard, Bennington Sur. Drlg. 4,435 ft.
Gulf Ref. Co. No. 1 Beal, Coy Sur. Drlg. 4,550 ft.
Heyser, Heard and Clardy No. 1-B Henderson, U. Ewing Sur. Drlg. 100 ft.
Heyser-Heard & Clardy No. 2 Henderson, ft. Bennington Sur. Set 7-in. csg. 6,020 ft.; T.D. 6,048 ft.; comp.; 25 B.P.H.; ⅛-in. ck.
Heyser, Heard & Clardy No. 3 Henderson, Bennington Sur. Set 10-in. csg 226 ft.
Phillips Pet. Co. No. 1 Pruitt-Lockett, U. Ewing Sur. Set 10¾-in. csg. 2,015 ft.; T.D. 2,021 ft.
Shell Pet. Corp. No. 2 Cooke, Bennington Sur. Drlg. sh.&L. 4,461 ft.
Shell Pet. Corp. No. 2-A Henderson, Bennington Sur. Drlg. L. 4,990 ft.

Panola County

C. K. Crews No. 1 Graves, McGowan Sur. S.D. 2,531 ft.
Glassell et al No. 1 Pierce & Chesbro, Soaps Sur. O.W.W.O.; old T.D. 5,881 ft.; W.O.

WEST TEXAS WILDCATS

Andrews County

Black No. 1 O. B. Holt, P.S.L. Sur. Drlg. 3,450 ft.
Drilling & Exploration Co. No. 1 Thornberry, P.S.L. Sur. M.I.M.
M. S. Forgeron et al No. 1 Lockhart & Brown, C NE¼ sec. 20, Blk. A-41, P.S.L. Sur. S.D. 179 ft.
Gulf Oil Corp. No. 1 State, sec. 8, Blk. 14. Sulfur wtr. in hole; P.B.
Honolulu Oil Co. No. 1-6 Parker, sec. 6. Blk. A-66, P.S.L. Sur. Comp.; D.&A.; T.D. 3,538 ft.
Seaboard Oil Corp. No. 1 Munger-Nix, sec. 1, Blk. A-4, P.S.L. Sur. Drill pipe stuck 1,664 ft.
H. C. Wheeler No. 1 T. M. Gardner, sec. 15, Blk. A-35, P.S.L. Sur. R.U.S.T.

Bailey County

Duffey & Etz No. 1 Enochs, Tract 66, League 182, Floyd Co. School Lands Sur. S.D.O. 4,160 ft.

Borden County

Continental Oil Co. No. 1-A Clayton, sec. 27, Blk. 32, Twp. 4n, T.&P. Sur. D.& A.; T.D. 3,530 ft.

Brewster County

F. C. Dodson No. 1 Texas American Synd., sec. 66, Blk. 10, G.H.&S.A. Sur. Drlg. 6,567 ft.
Toney Hess No. 1 Decie, C.T.R.R. Sur. S.D. 925 ft.
Storey No. 1 Wilson, sec. 3, Blk. 212, T.& St.L. Sur. S.D. 2,545 ft.

Cochran County

Devonian Oil Co. No. 1 Duggan, Oldham Co. Sch. Ld. Sur. Tstg. 5,044 ft.
J. R. Meeker et al No. 1 Wright, Mills City Sch. Ld. W.O.C. 4,934 ft.
P. N. Wiggins et al No. 1 Dean, NE cor. League 58, Martin Co. School Lands Drlg. 5,035 ft.; S.D. 4,826 ft.

Concho County

Sam Murray No. 1 R. G. Armor, sec. 105. T.&N.O. Sur. S.D. 70 ft.

Coke County

Barnett Pet. Co. No. 1 J. R. Mims, sec. 39 Blk. W. T.&P. Sur. Drlg. 1,615 ft.
H. E. Ogden et al No. 1 Rawlins, sec. 390 Blk. B-21. Drlg. 1,850 ft.

Cottle County

F. P. Hinds et al No. 1 Lee, 5 mi. SW of Paducah, A.B.&M. Sur. Cg. 4,385 ft.
Wilcox O. & G. Co. No. 1 Richards et al, sec. 761, Blk. Y, W.&G. Sur. M.I.M.

Crane County

J. W. Hampton No. 1 Thackston, W. L. Wilkinson Sur. S.D. 2,200 ft.
Wilcox O. & G. Co. No. 1 McKnight, sec. 9, Blk. 46, Twp. 3s, G.M.M.B.&A. Sur. D.&A.; T.D. 7,221 ft.

Crockett County

Moore Bros. No. 1 Perner, sec. 37, Blk. 2, I.&G.N. Sur. Drlg. 8,810 ft.
J. N. Simpson No. 1 Hoover, G.C.&S.F. Sur. Tstg. 2,067 ft.
Stewart & Cormas No. 1 Hoover, sec. 1 Blk. FF, B.B. Sur. W.O.C. 1,930 ft.

Culberson County

Grisham & Hunter No. 1 fee, sec. 14, Blk. 42, P.S.L. Sur. M.I.S.T.
C. A. Jarrell et al No. 1 C. M. Caldwell, C of SW¼ sec. 15, Blk. 100, P.S.L. Sur S.D. 507 ft.; H.F.O.; drlg. water well 150 ft.

Dawson County

Albaugh No. 1 Robinson, E.L.R.R. Sur. T.D. 5,038 ft.; tstg.

Dickens County

C. E. Litchfield No. 1 Harris, sec. 354 Blk. 1, H.&G.N. Sur. Comp.; D.&.A.; T.D. 2,001 ft.
J. F. Morrisey et al No. 1 C. L. Bird, sec 290. Blk. 1, H.&G.N. Sur. S.D.; W.O. 2,000 ft.

Ector County

Bodins et al No. 1 Edwards. Drlg. 4,054 ft.
Wentz Oil Co. No. 1-D Parker. Drlg. 4,529 ft.
Oil Well Dev. Co. No. 1 Cowden. Tstg. 4,287 ft.
L. H. Wentz Oil Co. No. 1-B Parker. Drlg. 4,335 ft.
Melhoan Drlg. Co. No. 1 Gulf Blakeney. Cg. 4,118 ft.

Edwards County

A. P. Carter No. 1 F. D. Sweeten. B.&B. Sur., 2 mi. E of Rock Springs. Drlg. 5,660 ft.
Lyles & Dan Auld No. 1 Henderson, H.E. &W.T. Sur. S.D. 3,200 ft.
Richmond Drlg. Co. No. 1 Brown, G.W. T.&P. Sur. Drlg. 5,540 ft.

El Paso County

Tri-State Oil Co. No. 1 Kinkel. Drlg. 3,485 ft.

Fisher County

Daniel & Rhodes No. 1 Nichless, Geo. W. Lawrence Sur. C.O. 3,300 ft.
Dean Bros. No. 1 Young, Comp.; D.&A.; T.D. 3,110 ft.
General Crude Oil Co. No. 1 Morrow sec. 185, Blk. 2, H.&T.C. Sur. Drlg. 3,537 ft.
Southern Oil Co. No. 1 Bocat, H.&T.C. Sur. S.D.O. 4,016 ft.

Floyd County

Mills Bennett No. 1 T. Montgomery, F. J. Latham Sur., 6 mi. S of Floydada. Drlg. 4,190 ft.

Gaines County

Amerada Pet. Corp. No. 1 R. W. Robertson, sec. 196, Blk. G, W.T.R.R. Sur. W.O.C. 3,468 ft.
Carter, Continental & Plymouth et al No. 1 Geisecke, S.D. 2,130 ft.
Shell Pet. Corp. No. 1 M. B. Robinson, sec. 344, Blk. G, C.C.S.D.&R.G.N.G. Sur. W.O.C. 4,345 ft.

Garza County

M. L. Richards No. 1 Slaughter. Drlg. 3,468 ft.

Glasscock County

O. B. Greathouse No. 1 Burns, sec. 221, Blk. 29, W.&N.W. Sur. M.I.S.T.

Hockley County

Gulf Oil Corp. No. 1 M. G. Gordon, sec. 12, Blk. X, P.S.L. Sur. Loc.
Gulf Oil Corp. No. 1 Mallett Ld. & Cattle Co., sec. 6, Blk. X, P.S.L. Sur. Loc.
Honolulu Oil Co. No. 1-51 Dorthy Slaughter, Labor 51, League 37, Zavalla Co. Sch. Lds. Loc.
Honolulu Oil Co. No. 1-77, Labor 77, League 37, Zavalla Co. Sch. Lds. Loc.
Sid Richardson No. 1 Slaughter, Maverick Co. Sch. Lds. Drlg. 4,351 ft.
The Texas Co. No. 2 Slaughter, Labour 92, League 37, Zavalla Co. Sch. Lds. Drlg. 4,965 ft.; S.O.

Howard County

Lockhart Oil Co. No. 1 Hussinger, sec. 67, Blk. 29, W.&N.W. Sur. Drlg. 677 ft.
W. F. McDermott et al No. 1 Lucas, sec 18, Blk. 29, Twp. 1n, T.&P. Sur., 5 mi. N of Dodge pool. Drlg. 3,077 ft.

Hudspeth County

Haymon Krupp Oil & Ld. Co. No. 1 Thaxton, SE¼ sec. 34, Blk. 74, Twp 6. Drlg. 3,592 ft.
Haymon Krupp No. 1 Briggs, sec. 24, Blk 73, Twp. 7, T.&P. Sur. Straight reaming 2,550 ft.

Jeff Davis County

Joiner Oil Corp. No. 1 Jones-Coffield. S.D. 3,500 ft.

Lamb County

Toddie L. Wynne, Tr. No. 1 Naunschwander, Labour 1, League 660, State Cap't. Lds. Drlg. by drill pipe 3,285 ft.

Loving County

Barnett Pet. Co. No. 1-A Johnson, sec. 2. Blk. 57, Twp. 1, T.&P. Sur. S.D.O. 3,846 ft.
Carpenter & Grierson No. 1 Mrs. Bennie Barnes, sec. 22, Blk. C-25, P.S.L. Sur Loc.
Woodley Pet. Co. No. 1 Klah, T.&P. Sur. S.D.; flwd. 40 B.P.D.; T.D. 3,963 ft.

Lynn County

John L. Baldridge No. 1 Alma Lbr. Co., sec. 151, H.E.&W.T. Sur. Drk.

McCulloch County

Westbrook et al No. 1 Johnson, A. Nevendorf Sur. Drlg. 1,828 ft.
Nixon No. 1 Pierce. S.D. 1,001 ft.

Martin County

Harris-Anderson Oil Corp. No. 1 Mollie Robinson, sec. 33, Blk. 38, T.&P. Sur. Swbg.; T.D. 4,179 ft.

Menard County

G. A. Clements No. 1 Murchison, sec. 80. B.S.&S. Sur., 8 mi. E of Menard. Drlg. 380 ft.
C. D. Haggerty No. 1 Callon, sec. 36, Jim Franz Sur. Spud. and S.D.

Nolan County

Marland-Drake Drlg. Co. No. 1 J. H. Withers, sec. 65, Blk. 21, T.&P. Sur Loc.

Pecos County

Harry Baker et al No. 1 White & Baker, sec. 53, Blk. 194, C.C.&S.F. M.I.M.
J. J. Dorr et al No. 2 Payton, sec. 99, Blk. 8, H.&G.N. Sur. Cellar and pits.
Ed Falney No. 1 Trees, sec. 63, Blk. 8, H.&G.N. Sur. M.I.S.R. 2,055 ft.
E. W. Francis et al No. 1-A Westman, T.&S.L. Sur. Drlg. 2,975 ft.
Magnolia Pet. Co. No. 1 McKee. Set 9-in. 5,294 ft.; W.O.C.S.
Messenger & Osborn No. 1 Humble-Young, sec. 49, Blk. 10, H.&G.N. Sur. S.D.R. 1,807 ft.
S. Thompson No. 1 Elsinore Cattle Co., sec. 54, Blk. D, G.C.&S.F. Sur. Drlg. 7,128 ft.
Thompson & Minshall No. 1 Michaelson, 660 ft. N and W. sec. 24, Blk. 146, T.& St.L. Sur. Drlg. 2,750 ft.
Trans-Pecos Oil Co. No. 1 Gallagher, T.&P. Sur. S.D. 1,610 ft.
Trans-Pecos Oil Co. No. 3-A Papham, G.H.&S.A. Sur. S.D. 1,934 ft.
Wilcox O. & G. Co. No. 1 Serf, sec. 27, Blk. 130, T.&St.L. Sur. Drlg. 650 ft.

Presidio County

L. C. Brite No. 4 fee, C NW¼ sec. 113, Blk. 12, G.H.&S.A. Sur. 6-in. cmt. 4,375 ft.

Reeves County

Barnett Pet. Corp. No. 1 Ely, sec. 38, Blk. 71, P.S.L. Sur., 12 mi. NW of Toyah. Drlg. 3,605 ft.
Ohio Oil Co. No. 1 Papham, sec. 18, Blk. 54, T.&P. Sur. Drlg. 80 ft.

Runnels County

E Z Oil Co. No. 1 B. Fletcher, E. C. Good Sur. T.D. 4,394 ft.; P.B. to 4,360 ft.; W.O.C.S.

Schleicher County

J. M. Cooper No. 2 B. Page, sec. 40, Blk. L, G.H.&S.A. Sur. S.D. 5,004 ft.
Tex-Tor Oil Corp. No. 1 Judkins & Spencer, C of SW¼ sec. 33, Blk. A, A.&B. Sur. Fsg. 5,452 ft.

Scurry County

Robinson Drlg. Co. No. 1 Martin, sec. 147, H.&T.C. Sur. P.B. 2,590 ft.; S.D.
T. G. Shaw Oil Co. No. 1 First Natl. Bank. Drlg. up iron 2,750 ft.

Stonewall County

General Crude Oil Co. No. 1 J. D. Smith, sec. 371, Blk. 2, H.&T.C. Sur., 12 mi. N Rotan. Drlg. 510 ft.

Sutton County

Ordovician Oil Co. No. 1 Evans, sec. 1, L. Stubblefield Sur., 32 mi. SE of Sonora. Drlg. 3,985 ft.

Terrell County

D. & S. Oil Co. No. 1 Sam Bell. S.D. 345 ft.

Terry County

C. H. Hutto No. 1 Brownfield, E.L.R.R. Sur. S.D. 687 ft.

Tom Green County

Humble O. & R. Co. No. 1 Lewis & Ward law, sec. 5, Blk. 17, H.&T.C. Sur. Drlg. 3,850 ft.

Upton County

W. D. Riser et al No. 1 King Ranch Oil & Lignite Co., sec. 8, Blk. 3, M.K.&T. Sur. S.D.R. 15 ft.
Rutter et al No. 1 Egolb, sec. 5, J. H. Gibson Sur. T.D. 3,250 ft.; swbg.
J. S. Pitman No. 1 D. Elder, C.C.S.D.& R.G.N.G. Sur., Blk. 3, sec. 14. U.R. 1,160 ft.

Ward County

Cities Service No. 2 Brandenburg, sec. 4, Blk. 32, H.&T.C. Sur. Drlg. 1,750 ft.
M. J. Delaney No. 1 E. Cooper, H.&T.C. Sur. Drlg. 3,020 ft.
J. E. Fitzpatrick et al No. 1 H. B. Carr, sec. 125, Blk. 34, H.&T.C. Sur. S.D. 123 ft.; R.U.S.T.
J. E. Fitzpatrick et al No. 1 F. K. Dyer, sec. 135, Blk. 34, H.&T.C. Sur. S.D. 123 ft.
Hoss & Downey No. 1 Meyers, sec. 17, Blk. 32, H.&T.C. Sur. Drlg. 614 ft.
Hoss & Downey No. 1 Ross Avery, sec. 36, Blk. 1, H.&T.C. Sur. S.D. 640 ft.
Patillo & Webster No. 1 Johnson. Drlg. 1,555 ft.
Sayre Oil Co. No. 1 Bertner, sec. 34, Blk. 1, H.&T.C. Sur. Drlg. 60 ft.
O. E. Schkode No. 1 Boogher, sec. 1, Blk. 32, H.&T.C. Sur. Drlg. 160 ft.
L. F. White et al No. 1 Rector-Monroe, E cor. sec. 3, Blk. 1, W.&N.W. Sur. S.D. 4,710 ft.

Yoakum County

Bahago & Bond Oil Corp. No. 1 J. L. West, sec. 607, Blk. D, J. H. Gibson Sur. Drlg. 3,960 ft.
Ohio No. 1 Claywater, sec. 638, Blk. D, J.H. Gibson Sur. R.U.R.
Shell No. 1-C Baumgart, sec. 866, Blk. D, J. H. Gibson Sur. Drlg. 860 ft.
Texas Co. No. 1 Walker, sec. 794, Blk. D El. 3,656 ft.; T.D. 5,180 ft.; P.B. 5,162 ft.; S.D. 5,162 ft.
Stogner & Pipkin No. 1 Blade, J. H. Gibson Sur. S.D.; W.O. 5,266 ft.

E. C. TEXAS WILDCATS

Anderson County

Humble O. & R. Co. No. 1-C Southern Pine Lbr. Co. Drlg. 9,147 ft.
H. L. Parsons No. 1 H. B. Hemby, 7 mi. NE of Navarro. W.O.C. 5,487 ft.

Angelina County

J. C. Bonham No. 1 Cameron Lbr. Co. E. Miller Sur., 3 mi. SE of Zavalla. S.D.
C. E. Parrott No. 1 J. C. Burres, W. Plucker Sur., 2½ mi. W of Huntington. Drk.

Bowie County

Ferguson-Hill No. 1 Breckenridge. S.D. 2,950 ft.
King Oil Corp. No. 1 W. W. Ames, 800 ft. S and 1,650 ft. E of J. A. Tolbott Sur 4½ mi. NW of Texarkana. Drlg. 3,200 ft.

Cherokee County

Merica Oil Co. No. 1 Cherokee Dev. Co., A. J. Acker Sur., 2 mi. E of Maydelle. M.I.M.

Dallas County

Plaza Oil Co. No. 1 Davidson, Marchants Sur., 1 mi. NW of Seagoville. R.U.

Falls County

McCleod et al No. 1 F. Bolton, J. R. Cockrill Sur., 4 mi. NW Rosebud. Fsg. 1,708 ft.

Freestone County

C. E. Rossiter No. 1 J. P. Fulton in J. P. Fulton Sur., 2½ mi. E of Donie. S.D. 956 ft.

Grayson County

Denver Prod. & Ref. Co. No. 1 E. B. Moore, E. Barnes Sur., ½ mi. NW of Whitesboro. Drlg. 200 ft.

Gregg County

Humble O. & R. Co. & Gulf O. Corp. No. 1 E. Robertson, M. Mann Sur., 2½ mi. SW of Longview Trinity test. El. 272 ft.; drlg. 7,959 ft.

Hill County

J. Willis No. 1 W. P. Ball, S. Marshall Sur., 3 mi. NW of Covington. M.I.M.

Lamar County

Cooper Bros. No. 2 L. B. Hayes, L. Roberts Sur. Loc.

Limestone County

C. L. Brown No. 27 N. B. Boyd, R. B Longbotham Sur., 3 mi. S of Wortham T.D. 1,402 ft.; oil sd.; S.D.W.O. 1,455 ft.
Pure Oil Co. No. 10-T Kendrick, P. Varella Sur., Mexia field. P.B. from 8,847 ft.; tstg. 5,515-56 ft.
Stanolind O. & G. Co. No. 1 T. Norris, in Thresher Sur., 5 mi. N of Kosse: 6,500-ft. test; elev. 528 ft.; drlg. 7,618 ft.

McLennan County

Chapman & Kahn No. 1 Carl Hartsman, B. C. Walters Sur., 1½ mi. S of McGregor. Drlg. 773 ft.

Navarro County

Mrs. Jane Robinson No. 1 Fortson Bros., Eli Smith Sur., 5 mi. NE Corsicana. S.D. 1,940 ft.

T. Sharpe et al No. 1 E. B. McDowell, T. Jordan Sur., 1½ mi. S of Bassets. S.D. 3,160 ft.

Trinity County

Bilinoski et al No. 1 Trinity State Bnk., B. F. Wright Sur., 2 mi. S of Trinity. S.D. 120 ft.

Upshur County

Tom Hunter and American Liberty No. 1 J. P. Carter, J. H. Fields Sur. Drlg. 5,590 ft.

L. & G. Oil Co. No. 1 H. Williams, Roeder Sur., 2 mi. NW of Gracetown. Drlg. 3,752 ft.

NORTH TEXAS WILDCATS

Archer County

Wayne King et al No. 1 C. A. Arthur, sec. 3, G.H.&H. Sur. A-158. Spdg. 100 ft.

Thos. A. Jirik No. 1 D. L. Wolf, J. Poltevent A-348 Sur. Loc.

Baylor County

D. S. Kelly No. 1 W. T. Waggoner, sec. 54, T.&N.O. Sur. Drlg. 1,000 ft.

Clay County

Barnett Pet. Co. No. 1 Ben Nutter, sec. 30, Grayson Co. Sch. Lds. Drk.

Healdton O. & G. Co. No. 1 Wallace, Belcher Subd. Cg. 3,310-25 ft.

Seitz, Comegys & Seitz No. 1 L. Wright, sec. 2632, T.E.&L. Sur. Set surf. csg. and W.O.C.

Cooke County

Byars & Nenny No. 1 W. A. Scroggins S. P. Yearwood Sur. A-1,554. Drlg. 2,872 ft.

W. O. Russell No. 1 Bundy P. Cady. Sur. Testing S.S.O. 2,164-68 ft.

W. O. Russell No. 1 J. W. Sherrill, Wm. Phelps Sur. A-821. S.D. 2,121 ft.

Seitz, Comegys & Seitz No. 1 J. D. Walker, F. Hamilton Sur. A-448. Drlg. 640 ft.

Whitfield, Pearson & Grimes No. 1 W. G. Dozier. Drlg. 650 ft.

Denton County

W. C. Curry et al No. 1 G. F. Owens, N. Rudder Sur. A-1,060. Drlg. 1,480 ft.

Foard County

Texas Co. No. 14 Johnson, sec. 37, S.P. R.R. Sur., Blk. L. Lime 3,760-80 ft.; treating with acid.

Jack County

Hanlon-Buchanan, Inc., No. 1 Ed M. Myers, N. F. Rudmose Sur. A-1,803. O.S. 3,830-40 ft.; shot with 40 qts.; 2,800 ft. of oil in hole; S.D.O.

O. J. Perrin No. 1 J. S. Rhodes, J. W. Coates Sur. A-1,240. R.U.R.

Taubert & McKee No. 1 R. H. Eatherly. J. H. Henderson Sur. A-1,749. Spud. and S.D.

Van Eman & Richards No. 1 Whitsell. Wm. McElroy Sur. A-599. Drlg. 1,895 ft.

Montague County

Bridwell Oil Co. No. 1 W. W. Radford, M. Burnside Sur. C.O. 2,320 ft.

J. W. Sorrell et al No. 1 J. E. Walthall Sam. H. Smith Sur. A-662. Drlg. 2,718 ft.

Wichita County

Geier Bros., Inc., and F. B. Jackson, Jr., No. 1 C. F. Ancell, W.&M. Sur. A-1292. 6⅝-in. 3,960 ft.; R.U.S.T. to drill plug.

W. E. Hammon No. 1 Mrs. H. Laik, Blk 284, W.C.S. Sur. U.R. 10-in. csg.

Rathke Oil Co. No. 1 S. B. Burnett "Gulf," sec. 4, H.T.&B. Sur. A-752. Drlg. 2,660 ft.

E. J. Stump No. 1 M. P. Bishop, L. Netherly Sur. A-240. S.D.O.; S.L. 3,885-3,997 ft.

Clyde Texan Oil Fields Co. No. 1 A. W. Burnside, John M. Sharp Sur. A-262 S.L. 3,935-76 ft.; C.O. after shot.

Joe A. Worsham No. 1 Waggoner Bros., sec. 13, B.S.&F. Sur. A-343. Core O.S. 2,785-88 ft.; rng. 6⅝-in.

T. L. Wynne, Tr., No. 1 Waggoner Bros., Lot 36, H. George Sur. 6⅝-in. 3,846 ft.; drlg. 3,910 ft.; S.L. 3,876-86 ft.; C.O. after shot.

Wilbarger County

Barry & Hayes No. 1 McGill, sec. 3, Blk. 9, H.&T.C. Sur. S.D. 3,030 ft.

W. Little No. 1 A. P. Morris, sec. 3, H.T. &C. Sur., Blk. 14. Drlg. 1,899 ft.; S.D.O.

Phillips Pet. Co. No. 1 W. T. Waggoner "Barger," sec. 11, H.&T.C. Sur., Blk. 14. U.R. 8¼-in. 2,130 ft.

B. R. Rainwater No. 1 J. A. Turkett, Blk. 8, W.C. Sur. Loc.

Young County

Anzac Oil Corp. No. 1 E. S. Graham, A. Hines Sur. A-135. Fsg.; treating L. 3,672-3,775 ft.

C. E. Beavers et al No. 1 Cooper, sec. 81. T.D. 1,197 ft.; S.D.O.

N. B. Crenshaw No. 1 J. C. Dwight, sec. 1,444, T.E.&L. Sur. S.D. 400 ft.

L. A. Long No. 1 F. A. Burnett, E. G. Rector Sur. No. A-239. R.U.C.T.

RANGER (CENTRAL TEXAS) DISTRICT

Brown County

C. R. Cox, Tr., No. 1 Jan Lee, sec. 11, B.B.B.&C. Sur., NE cor. county. S.D. 440 ft.

H. P. Evans No. 1 J. T. Hall, 2 mi. N of Bangs, 220 ft. from N line and 11,008 ft. from W line of SW¼ sec. 25, H.T. &B.R.R. Sur. Drlg. 650 ft.

R. B. Irving et al No. 1 T. C. Giddings, 390 ft. from S line and 3,382 ft. from W line of J. J. Clelland Sur., 1 mi. E Thrifty. Correct owner was Irving & Prairie Oil Co.; 1,500-ft. test; drlg. 510 ft.

Lyon-Roush No. 1 W. D. Mullis, 12 mi. SW of Bangs, 1,170 ft. from N and E lines of A. D. Nell Sur., Subd. 33. Loc.; 1,000-ft. test.

R. M. Ragsdale et al No. 1 Cox &-McGinnis, 10 mi. SE Cross Cut, 330 ft. from N & E lines of J. H. Rider Sur. A-1570. Loc. 2,500-ft. test.

Callahan County

Bibble & Prather No. 2 Ace Hickman, 2 mi. NW Admiral, 320 ft. from NE and 480 ft. from E line of NW¼ NE¼, sec. 1, I.&G.N. Sur. Drlg. 290 ft.

Dudley Dev. Co. No. 1 Smith Hrs., 7 mi. NW of Oplin, 1,080 ft. from S line and 620 ft. from W line of W½ of SW¼ sec. 4, S.P.R.R. Sur., Blk. 1. Loc.; 2,200-ft. test.

R. F. Gilman et al No. 1 W. A. Young, 5 mi. NW Clyde, sec. 37, B.B.B.&C. Sur. Drlg. 1,800 ft.

Hal Hughes No. 1 Poindexter, sec. 350, Geo. Hancock Sur., 2 mi. NE of Oplin. T.D. 3,175 ft.; S.D.

J. C. Jackson et al No. 1 Thompson, 2 mi. S. Eula, sec. 30, B.B.B.&C. Sur. S.D. 1,510 ft.

S. B. Owens No. 1 H. Shanks, 6 mi. N of Oplin, 660 ft. from S and W lines of farm or 660 ft. from S line and approx. 2,800 ft. from E line of sec. 1. S.P.R.R. Sur., sec. 1, Blk. 1. Drlg. 2,100 ft.

Phillips Pet. Co. No. 1 Cozart, 1 mi. NW Scranton. M. Cherry Sur. S.D. 2,600 ft.

R. F. St. John No. 1 A. E. Dyer, 4 mi. NW of Clyde, 1,385 ft. from E line and 1,323 ft. from S line of sec. 40, B.B.B. &C. Sur. Prep. to set pipe; drlg. 1,950 ft.

Woodley Pet. Co. No. 1 Flores-Deep, 5 mi. SE of Baird, sec. 149, B.B.B.&C. Sur Sat. L. 4,223-33 ft.; trtd. 1,000 and 2,000 gals.; comp. T.D. 4,333 ft., 50 B.P.D.

Coleman County

J. F. Brock No. 1 J. H. Livingston, SE cor. SW¼ county, J. D. Waters Sur. No. 208. Drlg. 782 ft.

Vic Eckholm et al No. 1 W. S. Duty et al, 5½ mi. S of Burkett, 220 ft. from N and W lines of SE¼ sec. 25, H.T.&B. Sur. Spud 2,500-ft. test.

R. M. Ragsdale et al No. 1 Stewardson, 9 mi. S of Santa Anna, 1,650 ft. from E line and 450 ft. from S line of Wm. Harris Sur. No. 279. Loc. 100-ft. test.

J. Walker, Tr. No. 1 W. L. Vaughn, 1½ mi. SW of Trickham, 200 ft. from N and W lines of sec. 80, A. Lipscomb Sur. Loc. 1,300-ft. test.

Comanche County

N. D. Gallagher et al No. 1 Mrs. B. I. Terry, Desdemona pool, N. H. Kuykendall Sur. S.D.

Dobbs Oil Co. No. 1 Hodges, sec. 11, Blk. 2, H.&T.C. Sur. Drlg. 2,600 ft.

Eastland County

G. D. Chastain et al No. 1 Weddington, 4 mi. N. Cisco, sec. 496, S.P.R.R. Sur. L. 3,315-30 ft.; est. 40 bbls.; drlg. 3,810 ft.

Hickok Prod. & Dev. Co. No. 1 J. E. Donovan, 5 mi. NW of Cisco, 660 ft. from N and E lines of NW¼ sec. 489, S.P. R.R. Sur. Drlg. 3,030 ft.

T. W. Johnson et al No. 1 Mary L. Jackson, ½ mi. SE of Carbon, 555 ft. from N line and 160 ft. from W line of farm, or 555 ft. from N line and approx. 1,000 ft. from E line of sec. 34, H.&T.C. Sur., Blk. 2. Loc. 1,500-ft. test.

J. D. Kittrell No. 1 Reynolds, 5 mi. E of Carbon, sec. 23, H.&T.C. Sur., Blk. 1, Prep. to deepen.

Lone Star Gas Co. No. 1 M. Thomas, 5 mi. NW of Cisco, 668 ft. from N line and 660 ft. from E line of SE¼ sec. 478, S.P.R.R. Sur. Drlg. 920 ft.

Monark O. & G. Co. No. 1 Downtain, sec. 14 H.&T.C. Sur. Blk. 4, 3 mi. N Eastland. S.D. 2,175 ft.

J. R. Nichols et al No. 1 R. W. Murray Hrs., 3½ mi. SE of Carbon, 330 ft from N and W lines of SW¼ sec. 4 H.&T.C. Sur., Blk. 2. Loc. 2,100 ft.

Erath County

J. Hickey et al No. 1 Smith, 5 mi. SE Desdemona, J. B. Smith Sur. Shot with 165 qts. 2,906-3,065 ft. in sd.; S.D.

Fisher County

Sunray Oil Co. No. 1 Snowden Lse. (10-ac. tr.), 330 ft. from S line and 1,270 ft. from W line of Sur., 2½ mi. NE of Rotan, H.&T.C. Sur., sec. 185. Loc.

Jones County

Bells Wells Oil Co. No. 1 R. L. Pond, 4½ mi. NE Avoca, 330 ft. from S and W lines of NE¼ sec. 165, B.B.B.&C. Sur. Drlg. 2,500 ft.

Fain & McGaha Oil Corp. No. 1 Mrs. L. E. Williams, 3½ mi. SW Nugent, 220 ft. from S & W lines of NE¼ of Sec. 37. T.&P. Sur., Blk. 15. Sdy. L. 1,935-55 ft.; shot with 40 qts.; tstg.

Felmont & Adams No. 1 Woodson, 1½ mi SE Avoca, sec. 200, B.B.B.&C. Sur. 311. Drlg. 3,290 ft.

Owens-Snebold No. 1 Alice Rhodes, 4 mi. W of Nugent, 330 ft. from N and W lines of NW¼ sec. 31, T.&P. Sur., Blk. 15. Digging pits; 4,000-ft. test.

Grisham & Hunter No. 1 E. D. Appling, NW¼ county, 1,208 ft. from S line and 1,450 ft. from W line of SW¼ sec. 32, B.B.B.&C. Sur. Sand 2,490-2,500 ft.; 1 B.W.P.H.; drlg. 2,800 ft.

Gwynn & Overby et al No. 1 Mrs. W. D. Baker, 4½ mi. SE of Anson, 220 ft. from N and W lines of S½ of SE¼, sec. 36, O.A.L. Sur. S.D. 1,050 ft.

Mack Hayes and Montour Oil Co. No. 1 Chittenden, 7 mi. SE Hamlin, Subd. 18, McMullen & McGloin Sur. 337. Drlg. 2,725 ft.

W. L. Herring No. 1 J. S. Dodge, 1½ mi. SW of Hawley, 2,450 ft. W and 1,320 ft. N of most southerly SE cor. of sec. 5, T.&P. Sur., Blk. 16. D.&A.; T.D. 2,455 ft.

T. D. Humphrey No. 1 Fielder, 2½ mi. F Anson, sec. 34, O.A.L. Sur. Drlg. 2,505 ft.

Oil States Expl. Co. No. 1 Olson, 4 mi. N Avoca, sec. 182, B.B.B.&C. Sur. S.D. 2,265 ft.

Riddle et al No. 1 J. D. Freeman, 8 mi. SW Anson, sec. 6, T.&P. Sur., Blk. 17. S.D.

Roeser & Pendleton No. 1 fee, 2 mi. NW of Nugent, 2,800 ft. from N line and 3,240 ft. from W line of sec. 4, T.&P. Sur., Blk. 15. Drlg. 3,652 ft.

Shaheen Oil Co. et al No. 1 Jenson, 2 mi. E of Avoca, sec. 198, B.B.B.&C. Sur. S.D. 2,755 ft.

Dale Smith & Bert Fields No. 1 C. L. Carter, 3 mi. SW of Nugent, 220 ft. from N and W lines of SE¼ of SE¼ sec. 37, T.&P. Sur., Blk. 15. T.D. 1,890 ft.; S.O.; tstg.

Stanton & Miller No. 1 Gaither, 4½ mi. N of Anson, sec. 38, B.B.B.&C. Sur. S.D.

L. R. Terry et al No. 1 J. O. Bartlett, SE cor. county, 150 ft. from S and E lines of 40-ac. tr. in B.A.L. Sur., sec. 9. S.D. 500 ft.

Nolan County

Marland Drake No. 1 E. H. Woods, 6 mi. SW of Sweetwater, 1,320 ft. from S and W lines of sec. 65, T.&P. Sur., Blk. 21. Loc.

Mills County

Balyaet & Boyd No. 1 Westbrook, 7 mi.

Canadian Fields

(Continued from Page 136)

from 3,020 feet after laying new gas lines. Gas is being taken from the British American Oil Co. line which will supply fuel to Okalta Oils Nos. 7 and 8 in section 16-18-2w5.

In the far south, Davies Petroleums No. 3, LSD 7, section 33-17-2w5, is rigged with standard tools and will spud as soon as gas and water lines are completed.

North Turner Valley

In North Turner Valley, Royaltie Oil Co. No. 29 Turner Basin, LSD 7, section 27-20-3w5, has resumed after getting Madison limestone at 6,275 feet and cementing 6⅝-inch casing at 6,299 feet. This will be the first definite test of the west flank in the North Turner Valley area.

In the far north end, Home Oil Co. No. 1 Millarville, LSD 8, section 33-20-3w5, is shut down at 7,600 feet.

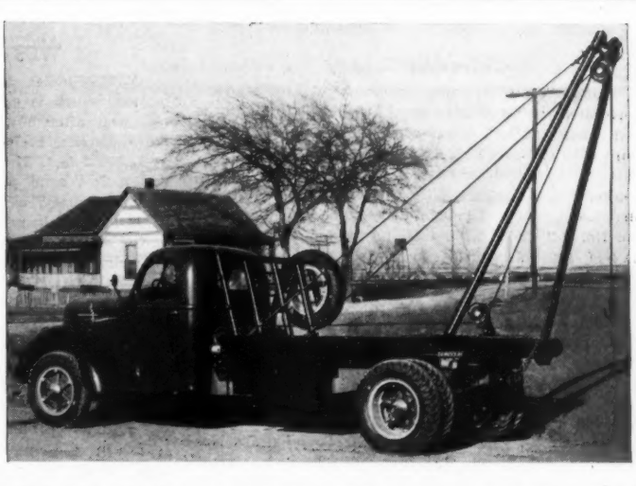
In section 16-18-2w5, Okalta Oil Co. No. 7, LSD 3, is rigging cable tools. Okalta No. 8, LSD 6, is working on derrick.

In section 32-18-2w5, Davies Petroleums No. 4 will be drilled in LSD 10, about a half mile north of Commoil No. 1 producer, on acreage secured from British Trans-Canada Oils, Ltd. Rotary equipment from Davies No. 1 will be moved to location as soon as the latter is finished. Drilling is to start not later than April 15.

In the Taber field, southern Alberta, Plains Petroleum Corp. No. 2, LSD 11, section 25-9-17w4, bottoming at 3,222 feet, is shut in, with a fair potential production.

Drilling in Ontario

In the Brownsville field, Oxford County, Ontario, Aloka Oil & Gas Co. No. 3 Scanlon, Lot 25, Concession 11, Dereham Township, finished around 940 feet. Initial open flow was 1,000,000 feet. Reed & Adams No. 2, T. M. Moore farm, Lot 27, Concession 12, in the same horizon got about 3,500,000 feet.



TRAILER AND TRUCK BODIES
OIL FIELD TRUCKING EQUIPMENT
BARBOUR
MANUFACTURING & EQUIPMENT CO.
TRAILERS — TRUCK BODIES
FACTORY AND MAIN OFFICE:
1109 N. MAIN ST., FORT WORTH, TEL. 6-2022
NORTHWEST TEXAS BRANCH:
IOWA PARK, TEXAS TEL. NO. 1

W of Goldthwaite, 4,950 ft. from S line and 4,290 ft. from W line of Caldwell Co. Sch. Ld. Sur. Drlg. 900 ft.

Palo Pinto County

Brazos River Gas Co. No. 5 M. B. Costello B, 1½ mi. N Pickwick, 1,397 ft. from N line and 150 ft. from W line of survey (W line being river bank), 660 ft. SW No. 4, R. R. Williams Sur. Drlg. 3,100 ft.

W. H. Clement No. 1 Federal Life Ins. Co., 2 mi. W Mineral Wells, sec. 51, T.&P. Sur., Blk. A (E of B). Drlg. 1,510 ft.

Bill Cole et al No. 1 J. W. Harris Est., NW cor. county, De La Garza Sur. Drlg. 910 ft.

W. K. Gordon et al No. 1 Johnson, 5 mi. N Gordon, John Bird Sur. Drlg. 3,550 ft.

Henry Hobbs et al No. 1 Bessie Holt, 4 mi. S. Graford, sec. 1,783, T.E.&L. Sur. S.D. 200 ft.

King Oil Co. No. 1 S. F. Lee, 4 mi. NW Graford, 933 ft. from N and W lines of sec. 1,744, T.E.&L. Sur. Drlg. 3,985 ft.

Ernest Lloyd et al No. 1 McClure, 3 mi. NE Graford, sec. 2,004, T.E.&L. Sur. S.D. 1,200 for csg.

Shackelford County

Joe DeGrazier No. 1 Harbough, E cen. part of county, sec. 1,563, T.E.&L. Sur. 4,500-ft. test; S.D. 360 ft.

Forest Dev. Corp. No. 1 T. G. Hindrick, NW cor. of county, 2,600 ft. from N line and 4,300 ft. from W line of sec. 1, A.B.&M. Sur. Drlg. 1,620 ft.

T. D. Humphrey No. 1 Alston, NE cor. county, sec. 16, H.&T.C. Sur., Blk. 3. Drlg. 1,998 ft.

Iron Mountain Oil Co. No. 1 E. O. Beck, NW cor. county, 300 ft. from S line and 299 ft. from W line of sec. 162, B.B.B. &C. Sur. Loc.

C. J. Kleiner et al No. 1 Morris, 2 mi. NE Bluff Creek pool, sec. 187, E.T.R.R. Sur. Drlg. 2,065 ft.

F. G. Lippitt et al No. 1 W. I. Cook Est., 3 mi. NE Cook pool, 1,470 ft. from E line and 150 ft. from S line of S½ SE sec. 53, E.T.R.R. Sur. Loc.

Owens-Sneboid Oil Corp. No. 1 Haterius, sec. 163, B.B.B.&C. Sur. L. 3,190-91 ft.; S.O.; prep. to test.

R. C. Parker No. 1 J. Smalley, NW cor. of NE¼ county, 1,245 ft. from N line and 1,260 ft. from E line of sec. 11, E.T.R.R. Sur. M.I.M.

R. W. Widener No. 1 Mrs. N. B. Guitar, SW cor. county, 220 ft. from N and W lines of E½ of SE¼ sec. 56, T.&P. Sur., Blk. 14. Drlg. 1,810 ft.

Stephens County

Danciger Oil Ref. Co. No. 1 Mrs. Aileen Copeland, 8 mi. SE Ivan, 1,196 ft. from E line and 350 ft. from S line of sec. 1, M.E.P.&P. Sur. Drlg. 1,600 ft.

Graham, Hafner, Lane & Inman No. 1 J. N. Yocum, 5 mi. SE of Frankell, 250 ft. from N and E lines of farm or approx. 2,525 ft. from E line and 1,400 ft. from S line of John R. Carter Sur. S.D. 250 ft.

I. C. Little No. 1 R. M. Rogers, NE¼ of county, 150 ft. from E line and 1,980 ft. from S line of sec. 28, T.&P. Sur., Blk. 5. Drlg. 2,940 ft.

G. Willard Rich No. 1 M. M. Andrews, SW cor. county, 450 ft. from S line and 300 ft. from W line of N½ sec. 39, T. &P. Sur., Blk. 7. Loc.; 4,500-ft. test.

Stonewall County

General Crude Oil Co. No. 1 J. D. Smith, SW cor. county, 330 ft. from S and E lines of sec. 371, H.&T.C. Sur., Blk. 2. Loc.

Tarrant County

E. E. Hoffpauir et al No. 2 W. H. Davis, 2 mi. S Arlington, H. Blackwell Sur. S.D.O. 2,140 ft.

Taylor County

Dr. W. C. Braham et al No. 1 Ernest Armstrong, 3½ mi. E of Abilene, 220 ft. from S line and 330 ft. from W line of NE¼ SE¼ sec. 40, B.A.L. Sur. Loc.

Bert Fields et al No. 1 Sears, sec. 223, Blk. 64, H.&T.C. Sur. S.D. 1,530 ft.

A. Findley No. 1 Bowles Est., NE cor. county, sec. 26, B.A.L. Sur. S.D. 2,000 ft.

E. G. Mahan et al No. 1 Edna Alexander, 4 mi. NE of Abilene, 210 ft. from E line and 320 ft. from S line of E 80 ac. of S½ sec. 22, B.A.L. Sur. R.U. Spdr.

Wichita Prod. Co. No. 1 E. Lincicum, NE cor. of county, 990 ft. from N line and 1,195 ft. from E line of NW¼ sec. 21, B.A.L. Sur. D.&A. 2,155 ft.

Throckmorton County

Morris & Spoonts No. 1 Alden Bros., NW cor county, 1,350 ft. from E line and 3,210 ft. from S line of Raymond Sanches Sur. A-248. Drlg. 610 ft.

Henry Zweifel No. 1 J. H. Lee, 4 mi. NE of Woodson, 930 ft. from E line and 2,011 ft. from S line of J. A. George Sur. Drlg. 400 ft.

Wise County

Latex Oil Co. No. 1 Smith, 3 mi. E of Bridgeport, Jas. Couch Sur. T.D. 4,075 ft.; P.B. to 3,910 ft.; drlg. plug.

Gulf Coast Fields

(Continued from Page 116)

Brazoria County

(Production through quarter-inch choke)

Danbury field: Rowan Drilling Co.-Shell Petroleum Corp. No. 3 Jameson Estate, 1,960 feet, 230 bbls. Hastings field: Humble Oil & Refining Co. No. 4 Schindler, 6,080 feet, 648 bbls. Producers Investment Co. No. 3 C. H. Alexander, 6,100 feet, 629 bbls. Stanolind Oil & Gas Co. No. 5 Kidd, perforated casing 6,068-76½ feet, 6,024-58 feet, 597 bbls. Stanolind Oil & Gas Co. No. 13 Drake, 5,775 feet, perforated casing 5,761-68, 5,706-38 feet, 615 bbls.

Chambers County

Anahuac field: Gulf Oil Corp. No. 8 Wilcox, sand 7,099-7,120 feet, 633 bbls., quarter-inch choke. Humble Oil & Refining Co. No. 17-X Johnson, perforated casing 6,968-70 feet, 3,505,000 feet of gas. Turtle Bay field: Stanolind Oil & Gas Co. No. 5 Cooper, 6,610 feet, perforated casing 6,596-6,600 feet, 584 bbls., quarter-inch choke.

Fort Bend County

Thompson field: Naylor-De Costa No. 10 S. B. Gehr, 5,404 feet, 18 bbls., three-sixteenths inch choke.

Galveston County

Humble Oil & Refining Co. No. 21-A Maco Stewart, perforated casing 8,264-80 feet, 115 bbls., three-eighths inch choke at top, quarter-inch choke at 3,000 feet. Pure Oil Co. No. 3-B Sealy Hutchinson, 8,120 feet, 510 bbls., quarter-inch choke. Hitchcock field: N. W. Hunter No. 2 Stewart Title Guaranty Co., 5,702 feet, abandoned. High Island field: Stanolind Oil & Gas Co. No. 2-B Cade, 5,233 feet, perforated casing 5,070-80 feet, 270 bbls., quarter-inch choke.

Hardin County

John Deering No. 5 W. W. Cruse, 5,536 feet, 442 bbls., quarter-inch choke. Hardin field: Republic Production Co. No. 1 Frazier, 6,910 feet, Top sand 6,886 feet, 607 bbls., quarter-inch choke.

Harris County

Friendswood field: Humble Oil & Refining Co. No. 1 Glover, 6,052 feet, 536 bbls., quarter-inch choke. Humble Oil & Refining Co. No. 4 Beamer, 5,985-6,050 feet, 557 bbls., quarter-inch choke. Clinton field: Stanolind Oil & Gas Co. No. 1 M. E. Oates, 3,835 feet, 32 bbls. fluid, 22 per cent B.S. and W., pumping. Tomball field: Humble Oil & Refining Co. No. 1 Wagner, 5,593 feet, perforated casing 5,563-70 feet, 526 bbls., quarter-inch choke. Humble Oil & Refining Co. No. 3-B G. Scherer, 5,620 feet, perforated casing 5,540-64 feet, 116 bbls., quarter-inch choke.

Jefferson County

Humble Oil & Refining Co. No. 12 Guinn, 6,779 feet, 592 bbls., quarter-inch choke. Spindletop field: Unity Oil Co. No. 1 Roach, 3,510 feet, 540 bbls., quarter-inch choke.

Liberty County

Hardin field: Strake Petroleum Corp. No. 4 W. T. Finley, 8,034 feet, abandoned.

Polk County

Humble Oil & Refining Co. No. 7-B Kirby Lumber Co., 5,195 feet, 317 bbls., quarter-inch choke. Republic Production Co. No. 1 J. M. Whiteside, 6,061 feet, abandoned.

Wharton County

Texas Co. No. 42-Pierce Estate, 5,547 feet, 307 bbls., 12/64-inch choke.

Central West Fields

(Continued from Page 121)

from the Clinton at 3,242-84 feet. The last two wells listed were not shot due to proration. In Monroe Township, Thistle Oil Co. No. 1 Miles E. Joyce, NE quarter section 20, started with 30,000 feet of gas from the Berea at 1,032-52 feet. In Monroe Township, Weaver & Denman No. 2 Charles L. Weaver, NW quarter section 11, is good for 262,000 feet of gas from the Berea at 1,035-53 feet.

In Stark County, Jackson Township, East Ohio Gas Co. No. 1 Frank W. Miller, NW quarter section 2, produced 2,500,000 feet of gas initially from the Clinton sand at 4,327-47 feet.

In Washington County, Grandview Township, T. J. Hamilton and others No. 8 Forest Ridgeway, SW quarter section 28, made 78,000 feet of gas from Keener sand at 1,390-98 feet.

WESTERN KENTUCKY

OWENSBORO, Ky., Jan. 15.—The McClosky formation, which is so prolific in Illinois, yielded a 15-bbl. well after a shot. It was drilled in the Livermore district, McLean County. The pay was found at 1,285-92 feet. The best well of the week, however, was a Jett sand producer in the Island district of McLean County, which was good for 64 bbls. initially. It had not been shot. The crop of completions reported during the week was small, consisting of three oil wells, one gas well and four dry holes.

Breckenridge County

Glen Dean district: Bryan & Patton No. 2 Grace Patton, dry hole, through Bethel sand.

Daviess County

Hewlett's Store district: F. F. Gibson and others No. 1 Eddie Howard, 200,000 feet of gas, Jones sand at 938-46 feet; Barlow sand at 1,083-90 feet, light show of oil. Total depth was 1,092 feet. Hole was plugged back to 945 feet and saved as a gas well. Gibson & Ankeny No. 2 Dode Taylor was a location; No. 2 A. E. Bryant, an old gas well, was drilling deeper.

Grayson County

Falls of Rough district: A. V. Smith and others No. 7 Green Brothers was a dry hole through Bethel sand at 286-303 feet; total depth 304 feet.

Hancock County

Pellville district: C. D. Walker and others No. 5 Elmer Boling was a dry hole; Jett sand at 351-63 feet; total depth 405 feet. W. W. Damron and others No. 2 Cicero Phillips was spudding in.

Easton district: J. C. Ellis No. 9 W. C. Smith, 20 bbls.; Jett sand at 356-84 feet; shot with 120 quarts; No. 10 was rigging up. W. E. Hupp No. 4 Jethro Easton was rigging up.

McLean County

Livermore district: Jack Cox and others No. 1 D. A. Bennett bailed 4½ bbls. before the shot; estimated 15 bbls. after shot; will acidize; McClosky sand at 1,285-92 feet; shot with 30 quarts; total depth 1,292 feet. W. K. Snyder and others No. 1 Richard Shockley, spudding in.

Island district: South Penn Oil Co. No. 1 Robert Nall pumped 64 bbls. the first 24 hours from Jett sand at 1,415-35 feet; it has not been shot.

Ohio County

Heflin district: W. W. Damron and others No. 4 G. C. Rowan, on location.

Friendship Church district: A. D. Noe, Jr., and others No. 6 A. S. Crawley, location. Henry Scholl and others No. 3 Ida Farmer, drilling at 145 feet.

Taffy district: Carrell & Kontz No. 6 M. S. Bartlett, dry hole, total depth 466 feet.

Webster County

Sebree district: Powell & Garrison No. 1 Edwards estate was a location.

EASTERN KENTUCKY

ASHLAND, Ky., Jan. 17.—Two small oil completions are included in the continued light operations in Eastern Kentucky.

Both of these wells are in Lee County. The first, No. 7, on the C. J. Tipton land on Billies Fork in the Big Sinking district, was completed at a depth of 473 feet by Thomas Witmer. The well shows 5 bbls. of oil per day.

The second completion, in the same district, is No. 9 on the J. D. Crabtree land on Little Sinking. Petroleum Exploration completed the well at a total depth of 1,129 feet with a flow of 10 bbls. per day.

Other operations in Lee County are as follows: South Penn Oil Co. was drilling below 800 feet in No. 98 on Flahaven Land Co.'s land on Big Sinking. Oakes & Barnes are down 100 feet in No. 4 on the Andrew Combs land on Billies Fork. H. C. Wiggins is drilling below 825 feet in No. 1 on the Ray Smith land nearby.

In the South Fork district of Powell County, South Penn Oil Co. is down 600 feet in No. 7 William Adams, Jr., land on South Fork and was drilling below 200 feet in No. 3 on Matt Lowery at Mount Springs.

In Lawrence County, Kentucky Oil Producers were drilling at 325 feet in No. 2 on John Rose land on Keaton in the district of that same name.

In Pike County, Inland Gas Corp. is idle at No. 196 on Helen Leslie land on Levisa Fork. Work halted while rigging up.

In Floyd County, Kentucky-West Virginia Gas Co. is down 1,295 feet in No. 563 on the H. H. Smith land near Mouth Camp Branch but is idle this week. The same firm had reached 1,356 feet in No. 564 in Big lime on Jennie Caldwell land and is drilling at 1,040 feet in No. 565 J. I. Stepp land nearby. Kentucky-West Virginia was drilling at 1,265 feet in lime in No. 566 Samuel Dillon land on Ivy Creek of Levisa Fork and is idle at No. 567 M. Slone & M. D. Slone in the same locality. The same firm is moving in at No. 567, John F. Burchett land on Cow Creek. Inland Gas Corp. is drilling at the 1,476-foot level in No. 197 J. C. Hopkins on Stratton Branch of Levisa Fork, continuing in slate and shells.

In Martin County the Kentucky-West Virginia Gas Co. is in sand at 420 feet in No. 5235 on C. W. Preece land on Coldwater Fork and is building road to No. 5236 on the same land.

MARKET RECORD, ACTIVE OIL STOCKS

Compiled by Carl H. Pforzheimer & Co., 25 Broad Street, New York City, Member New York Stock Exchange and New York Curb Exchange

New York Stock Exchange

1938 High	1938 Low	Week ending Jan. 15 Sales	Week ending Jan. 15 High	Week ending Jan. 15 Low	Week ending Jan. 15 Close	Stocks—	Total shares outstanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1936	1937 High	1937 Low	1936 High	1936 Low
68½	57	6,100	68½	65½	68½	Amerada Corp.	788,675	N.P.	50cQ	10-30-37	$2.00	114⅞	51½	125½	75
22¼	20	7,500	22¼	21¼	22⅛	Atlantic Refining	2,664,000	$25	25cQ	12-15-37	1.25	37	18	35⅛	26⅝
18	14¼	3,900	18	16½	17⅜	Barber Co.	387,149	$10	75c	12-16-37	.50	43⅜	10⅛	38½	21
16⅛	13	16,000	16⅛	15⅛	15⅞	Barnsdall Oil Co.	2,247,974	$5	25cQ	2-1-38	.80	35¼	10	28¼	14⅛
10¼	8⅞	23,800	10½	9¾	10	Consolidated Oil Corp.	13,919,417	N.P.	20cQ	2-15-38	.80	17⅞	7	17¼	11½
34⅜	28¾	16,500	34⅜	31⅞	32¼	Continental Oil of Delaware	4,682,615	$5	25cQ	12-20-37	1.50	49	24	44⅞	28⅛
8⅞	6¼	24,700	8⅞	7⅞	8½	Houston Oil (new)	1,098,618	$25	....	10-17-30	....	17⅝	4¾	13⅞	6⅜
22⅝	18¼	6,400	22⅝	21	21¾	Mid-Continent Petroleum	1,855,912	$10	$1	11-1-37	1.15	35⅜	14	30⅞	17¼
17¾	15¼	1,800	17¾	17	17	Mission Corporation	1,399,345	N.P.	25c	12-24-37	.45	34	15	29⅞	16¾
22½	18½	14,800	22½	20½	21½	National Supply	382,591	$25	$2 pf.‡	12-22-37	....	41⅜	17⅝	75½	19⅞
14⅞	11⅞	22,900	14⅞	13¾	14½	Ohio Oil Co.	6,563,377	N.P.	50cSA	12-15-37	.60	22⅞	9	18	12⅛
15⅞	12	500	15⅞	14⅜	15⅛	Pacific Western Oil	1,000,000	N.P.	65c	12-18-36	.65	29¾	11¾	23½	11¾
8⅝	8¼	300	8⅝	8½	8½	Pan American Pet. & Trans.	4,702,945	$5	$1*	12-21-37	.60*	17½	7	20⅝	12¼
42½	38	27,800	42½	39¼	40⅛	Phillips Petroleum	4,449,052	N.P.	75cQ†	12-1-37	2.50	64	30⅛	52⅜	38⅛
19¼	17	4,000	19¼	18¼	19⅛	Plymouth Oil Co.	1,050,000	$5	35cQ	9-30-37	.90	29⅞	13	27¾	11⅞
13½	11	47,200	13½	12¼	13⅜	Pure Oil Co.	3,281,120	N.P.	25c	12-1-37	....	24⅜	8¾	24⅞	16
7⅞	5⅜	19,600	7⅞	7	7⅜	Richfield Oil Corp.	3,986,638	N.P.	25c	12-24-37	....	6½	4⅛	..	..
25¾	20	6,100	25¾	23⅞	24½	Seaboard Oil of Delaware	1,224,283	N.P.	25cQ	9-15-37	1.00	54⅛	16	44	30½
18¼	16¼	4,300	18¼	17¼	17⅜	Shell Union Oil	13,070,625	N.P.	50c	12-20-37	.25	34¾	14⅞	28¼	14¾
34⅜	28	2,900	34¾	32	32½	Skelly Oil	1,006,348	$15	50c	9-30-37	....	60⅝	26½	47⅜	19½
16⅝	14⅝	40,100	16⅜	15½	16	Socony-Vacuum	31,151,071	$15	30c	12-15-37	.70	23¼	13	17½	12⅛
33⅞	28⅝	14,200	33⅞	31⅜	32¼	Standard Oil of California	13,014,754	N.P.	80cQ†	12-15-37	1.20	50	27⅛	47⅝	35
35½	33⅛	12,400	35½	34⅝	35¼	Standard Oil (Indiana)	15,196,241	$25	$1Q†	12-15-37	2.40	50	26½	48½	32¾
..	..	No sales	..	..	..	Standard Oil of Kansas	134,841	$10	$5	12-20-37	1.00	43	30⅝	31	25
51⅜	44½	31,900	51⅜	48¾	50½	Standard Oil of New Jersey	25,856,081	$25	$1.25SA†	12-15-37	2.00	76	42	70⅜	51⅛
55⅛	49¾	2,500	55⅛	49¾	54¾	Sun Oil	2,156,825	N.P.	25cQ	9-15-37	$1 & 6% Stk.	77½	44½	91	70
3⅜	2½	19,200	3⅜	2⅞	3	Superior Oil Corp.	1,388,079	$1	....	.....	....	7¾	1½	6¾	3
44⅞	38	38,100	44⅞	42	43¾	Texas Corp.	10,896,858	$25	50cQ	1-2-38	1.50	65⅛	34¾	55⅛	28⅞
4⅞	3⅝	7,900	4⅞	4½	4½	Texas Gulf Producing Co.	888,134	N.P.	10c	12-23-37	.05	9⅝	2	8⅞	4⅜
9½	7¾	3,100	9½	8⅝	8¾	Texas Pacific Coal & Oil	888,237	$10	10c	12-1-37	.25	16⅝	5⅜	15¼	7½
15½	14	16,400	15½	14⅞	15⅜	Tide Water Associated	6,288,512	N.P.	15c Spl.	12-17-37	.70	21⅝	13⅛	21¾	14¾
21¼	18½	2,600	21¼	20½	20¾	Union Oil of California	4,386,070	$25	30cQ	2-10-38	1.00	28¼	17½	28½	20¾
23½	22⅛	1,100	23½	22½	23	Union Tank Car Co.	1,200,000	N.P.	40cQ	12-1-37	1.20	31½	22	31⅝	22⅝
2⅝	2¼	1,100	2⅝	2¼	2⅝	Wilcox Oil & Gas	424,839	$5	....	5-10-28	....	6¼	1¾	5¼	2⅜

*Payable in 3½% notes. †Includes extras. ‡One-tenth share $2 preferred stock.

New York Curb Exchange

1938 High	1938 Low	Week ending Jan. 15 Sales	Week ending Jan. 15 High	Week ending Jan. 15 Low	Week ending Jan. 15 Close	Stocks—	Total shares outstanding	Par value	Latest dividend	Payable or last paid	Dividends paid in 1936	1937 High	1937 Low	1936 High	1936 Low
9⅜	8	4,500	9⅜	9	9	American Republics Corp.	1,308,049	$10	30c	12-27-37	....	10	6⅝	..	..
10¼	8⅝	900	10¼	9¾	9¾	Bridgeport Machine Co.	260,000	N.P.	1.25	12-30-37	$1.00	21⅜	7	21	13¼
39	37½	150	39	39	39	Buckeye Pipe Line Co.	200,000	$50	75cQ	12-15-37	3.25	51½	36	50	39¾
101¼	100	50	101¼	101¼	101¼	Chesebrough Mfg. Co.	120,000	$25	$1.50Q†	9-30-37	7.00	123	95½	124¾	105
2	1⅞	26,200	2	1⅞	2	Cities Service	37,804,394	N.P.	....	6-1-32	....	5⅜	1½	7⅜	3
2⅜	1⅞	3,600	2⅜	2	2¼	Cosden Petroleum	399,687	$1	....	.....	....	5½	1½	4½	1½
27½	23¼	7,900	27½	26¼	26⅝	Creole Petroleum	6,974,356	$5	50cSA†	12-15-37	.50	38¾	20¼	39	19⅞
8¾	7	1,500	8⅝	7⅞	7⅞	Darby Petroleum	351,390	$5	25cSA	1-15-38	.50	18⅝	6½	18⅛	9
3½	3¼	200	2⅜	2⅜	2⅜	Derby Oil & Refining	263,162	N.P.	....	.....	....	8⅜	2¼	6¾	1⅞
31	31	50	31	31	31	Eureka Pipe Line	50,000	$50	$1Q	11-1-37	4.00	47½	24½	47½	38½
41½	37½	11,200	41¾	39⅛	41¾	Gulf Oil Corp.	9,076,202	$25	25cQ	12-1-37	1.50, 100% Stk.	63½	33	59	36
66	64	4,400	65½	64	64¾	Humble Oil & Refining	8,923,935	N.P.	62½cQ	12-27-37	1.50	87	54⅞	80	57
18¾	17⅞	4,900	18¾	18⅜	18⅝	Imperial Oil of Canada	26,919,871	N.P.	62½cSA†‡	12-1-37	1.25	24¼	14½	24½	19¾
7½	7¼	300	7½	7½	7½	Indiana Pipe Line	300,000	$10	50cSA	11-15-37	.80	15	5⅞	9¾	5½
30⅝	28½	5,700	30⅝	29¾	30	International Petroleum	14,247,088	N.P.	$1.25†‡	12-1-37	2.50	39½	23½	39⅝	32⅝
4¼	3¼	2,400	4¼	4	4	Kirby Petroleum Co.	500,000	$1	10c	9-15-37	.20	8¾	2⅜	5¾	2⅝
25⅛	18¾	10,400	25⅛	23⅛	24½	Lion Oil Refining	270,000	N.P.	50cQ†	12-24-37	.75	34	12½	17¾	7⅜
8⅞	7⅛	7,600	9¼	7⅞	9¼	Lone Star Gas	5,382,723	N.P.	20c	12-22-37	.60	14¼	5¼	14¼	9⅞
9⅜	8⅛	2,900	9⅜	8½	8⅞	Louisiana Land & Exp.	3,000,000	N.P.	20cQ†	12-15-37	.50	15¼	6¾	15⅜	9⅞
7⅝	7¼	800	7⅝	7½	7½	Midwest Oil Co.	998,444	$10	50c	12-15-37	....	14⅝	6¼	..	..
5	4⅝	900	5	5	5	Mountain Producers	1,682,182	$10	30cSA	12-15-37	.60	7⅞	4⅛	8⅜	5
14⅝	14	1,500	14⅝	14	14	National Fuel Gas	3,810,183	N.P.	25cQ	1-15-38	1.00	19½	12	23	17⅜
9¼	8	500	8¾	8½	8½	National Transit	509,000	$12.50	55cSA	12-15-37	.75	12½	7¼	15¾	9¼
2⅝	1¾	200	2	1⅞	1⅞	New Mexico and Arizona	1,000,000	$1	1c	12-1-36	.01	5	1⅛	6⅝	1⅝
4½	4½	No sales	..	..	..	New York Transit	100,000	$5	60c Spl.	12-28-37	.35	5⅜	3⅞	6¼	4¼
..	..	No sales	..	..	..	Northern Pipe Line	120,000	$10	25cSA	12-1-37	.40	12¾	5¾	9¾	4⅞
7	5½	46,300	7	6¼	6⅝	Pantepec Oil	1,608,700	N.P.	....	.....	....	9⅝	2¾	10⅛	3¼
3⅜	3	1,500	3⅜	3¼	3⅜	Root Petroleum Co.	336,045	$1	25c	2-1-37	.50	13¾	2	19¼	4½
4	3⅛	3,400	4	3⅝	4	Ryan Consolidated	296,931	N.P.	....	.....	....	6½	2¼	4¾	1⅞
38½	37¼	1,400	38	37¼	37¼	Southern Pipe Line	100,000	$10	25cSA	9-1-37	.25	7¼	3⅞	7⅞	3¼
5	4⅜	500	5	4½	5	South Penn Oil	1,000,000	$25	$1,15Q†	12-28-37	2.60	56	35	44	32½
..	..	No sales	..	..	..	Southwest Penna. Pine Lines	35,000	$50	50cQ	12-31-37	13.00	42	20	60	44
18	17	3,100	18	17⅝	17⅝	Standard Oil of Kentucky	2,604,790	$10	40cQ†	9-15-37	1.35	21⅛	14¾	23⅜	17⅛
..	..	No sales	..	..	..	Standard Oil of Nebraska	188,403	$25	25c	3-29-37	.25	13¾	8	14⅝	11
22	19⅜	900	22	20¾	20¾	Standard Oil of Ohio	753,740	$25	75cQ†	12-15-37	2.00	45	16	40	21¾
3⅛	2⅞	4,900	3⅛	3	3⅛	Sunray Oil	1,910,119	$1	10c	12-24-37	.10	4⅞	2	5	2⅝
4⅜	4	700	4⅜	4⅛	4¼	Texon Oil & Land	336,028	$2	15cQ	1-3-38	.60	7⅝	2	9¾	5⅜
5¼	4¼	18,900	5¼	4⅝	4⅞	United Gas Corp.	7,818,959	$1	10c	9-15-37	.20	13⅝	3	10¾	4

†Includes extras. ‡Payable in Canadian funds.

Note—In comparing highs and lows for the several years in the two tables, it will be necessary to take into consideration cases where there have been stock split-ups.

PERSONAL

SAM E. WILSON, independent operator of Corpus Christi, Tex., has established temporary headquarters in Houston, Tex., while drilling an outpost test in the Hastings field in Galveston County, Texas.

H. W. DODGE, vice president and sales manager; O. P. COTTRELL, assistant manager of the refining department; J. K. SKILLINGS, sales promotion manager, and STEVE BIRCH, advertising manager, all of New York; J. S. LEACH, manager of the sales department, southern territory, and C. B. BARRETT, manager of sales in the Houston district, both of Houston, were speakers at the annual district sales organization meeting of Texas Company in San Antonio, Tex., January 14.

R. W. ADAMS, JR., chief counsel for Pure Oil Company in Fort Worth, Tex., has been removed to his home from a hospital where he recently underwent an operation.

R. M. PITCHER, secretary and assistant treasurer of the British American Oil Producing Company and the Toronto Pipe Line Company for almost 11 years, resigned his post with these organizations January 15. Mr. Pitcher, whose home had been in Buffalo, N. Y., joined the British American and its associated company in April, 1927, when the offices were in Wichita Falls, Tex. The headquarters were transferred to Tulsa in October, 1929. Mr. Pitcher expects to continue to reside in Tulsa.

SHERMAN NELSON, member of the firm of Hantho-Nelson, Inc., independent oil operators of San Antonio, Tex., has moved to Houston, Tex., and established offices. H. C. HANTHO, the other member of the firm, will remain in charge of the San Antonio office. Associated with Mr. Nelson in Houston will be W. M. HARRIS, J. R. PRINCE, and J. R. CHATHAM.

ALLAN H. CALDERWOOD has been made manager of the Martinez, Calif., refinery of Shell Oil Company. Mr. Calderwood started with Shell in Los Angeles in 1923 as assistant draftsman and pipefitter's helper. After intensive experience in all phases of petroleum manufacturing Mr. Calderwood was made assistant manager of the Dominguez refinery and then assistant manager at Martinez, the position from which he has just been promoted. Mr. Calderwood succeeds E. D. CUMMING, who joins the Shell Petroleum Corporation in St. Louis, Mo.

ROY WIGHT, formerly in the engineering department of the Texas Company in Fort Worth, Tex., is to go to Wink as assistant district superintendent of the West Texas territory.

JONAH JONES, prominent operator in the Long Beach field, has been elected president of the Southern California Tuna Club and was inducted into office by PHILLIP SWAFFIELD, another Long Beach operator.

CLARK BAKER is now associated with the Transwestern Oil Company as scout in the Corpus Christi district of Texas, replacing KEN CLARK, who was transferred to the company's main offices in San Antonio.

DAN J. MORAN, president of the Continental Oil Company, WALTER PYRON, vice president of the Gulf Oil Corporation, and GEORGE W. STRAKE, president of the Strake Petroleum Corporation, were elected directors of the National Bank of Commerce in Houston, Tex., the past week.

M. W. O'BRIEN, for years secretary-treasurer of Seaside Oil Company, has been elected president, succeeding the late J. F. Bushnell. Others elected with Mr. O'Brien were H. B. KELLOGG, vice president; G. C. HOWELL, secretary; H. L. HARMS, treasurer; G. D. McPHEE, assistant secretary.

HARRY M. NEILSON has been transferred from San Antonio to Midland, Tex., where he will serve as West Texas division geologist for Plymouth Oil Company in its newly established office. HYMAN CARMAN, LANGDON TENNIS, and E. L. TIPPS, formerly geologists with Plymouth in South Texas, also have been transferred to the Midland office. DEB GOODE, in Plymouth's land department, has moved from South Texas to Midland.

Do You Remember?

From The Oil and Gas Journal Files

25 YEARS AGO

The late Walter B. Sharp, president of the Producers Oil Company (the Texas Company), left an estate appraised at $792,000.

The federal government is after fake stock promoters in California. A batch of them were indicted in Los Angeles for using the mails to defraud.

Drillers and tool dressers in the Bremen field in Ohio go on strike demanding $6 a day for drillers and $5 a day for "toolies," which is a dollar more than they have been getting.

20 YEARS AGO

New York oil men are trying to promote a petroleum club in that city. If the plan goes through it is expected to be in the form of a dinner club.

J. O. Lewis, of the U. S. Bureau of Mines, is in Bartlesville, Okla., to make preliminary arrangements for erecting the bureau's oil research station in that city.

The Texas Company gets a 50,000-barrel well in the Chinampa-Tepetate district in Mexico from pay at 2,005 feet. Twenty-five wells in the Mexican field produced an aggregate of 54,590,000 barrels of oil in 1917, an average of over 5,900 barrels per day per well.

10 YEARS AGO

Nearly 19,000,000 barrels of crude oil is in storage in the Seminole field in Oklahoma. Indian Territory Illuminating Company has 3,653,000 barrels in steel tankage there.

The East Hackberry pool in Coastal Louisiana is opened by a 1,000-barrel well.

World petroleum production in 1927 is estimated at 1,254,000,000 barrels.

Maylon E. Layne, pioneer in the production of crude oil through screen, dies after a long illness. He was president of the Layne & Bowler Corporation.

William J. Alexander, 82, retired vice president of the Eureka Pipe Line Company, dies in Bradenton, Fla.

W. H. McFadden, vice president of the Marland Oil Company, resigns and will spend the winter in Cuba.

GRADY KIRBY, consulting geologist of San Antonio, Tex., has returned to that city after a trip through the Illinois Basin.

A. L. BOWDEN and JOHN DONNAN, of Pittsburgh, petroleum engineers, are en route to South America, accompanied by their wives.

ARNETT NORCOTT, a member of International Petroleum Company's staff in Talara, Peru, left last week for the South American operating headquarters.

TED EASTON, petroleum engineer for Richfield Oil Corporation in Bakersfield, Calif., won the men's singles in the Kern County tennis tournament last week.

A. A. GARRABRANT, vice president of Atlantic Refining Company, Philadelphia, left New York for Europe January 15 aboard the Ile de France and will be away several weeks.

J. K. HUFENDICK, former assistant district superintendent for the Texas Company in West Texas, with headquarters in Wink, is going to Cucato, Colombia, South America, with Colombia Pipe Line Company.

R. S. McFARLAND, of the Seaboard Oil Company, was renamed president of the Dallas Petroleum Club at a recent meeting of its directors. Other officers renamed were HARRY S. MOSS, vice president, and FRANK I. BRINEGAR, secretary-treasurer.

E. P. DONAHUE, superintendent of General Petroleum Corporation's absorption plant in Wilmington, Calif., suffered a broken leg when he slipped on a pipe in the 20-inch line which his company is constructing to transport gas from the new Long Beach wells. He is recovering in a Los Angeles hospital.

PARAGRAPHS

A. JACOBSEN, of New York, president of the Amerada Petroleum Corporation, and A. M. BLOW and E. S. PORTER, vice presidents, both of Tulsa, watched the completion of their company's wildcat which opened a new pool northwest of Houston, Tex., in Harris County, the past week.

R. B. BEDFORD, JR., in charge of marine sales activities of the Standard Oil Company of New Jersey, was the official host January 13 at "annual maneuvers and target practice" of the Seuss navy, a mythical nautical organization. RAY PERKINS, radio comedian; HARRY FOSTER WELCH, creator of Pop-Eye's film voice; "DOCTOR SEUSS," who is THEODOR S. GEISEL in the social security files, and JOSEPH DUNNINGER, a mystifying mystic, entertained the company's 500 guests at luncheon in New York. The official seal of the Seuss navy was christened "Nuzzlepuss," with a herring supplanting the traditional bottle of champagne.

GERALD G. BLUE, manager of insurance of Union Oil Company, with offices in Los Angeles, has resigned to enter the investment field.

IRA J. ELEY, independent oil operator in Abilene, Tex., for several years, has moved to Houston, Tex., his former home, where he will engage in the oil business.

HENRY C. REA, HOWARD M. KIRK, and ERNEST F. FOX, geologists of Inland Exploration Company, have transferred from northern Afghanistan to Iran for the winter. Next spring they will return to Afghanistan for further studies of oil-producing possibilities.

W. L. WALKER, formerly with Cities Service Corporation, has joined the land and lease division of Richfield Oil Corporation and in his new position will be associated with FRANK A. MORGAN, manager of exploration; ROY WILLIAM CARVER, assistant manager of lands, and NORMAN F. SIMMONDS.

J. WOOTEN, formerly district production superintendent for Stanolind Oil & Gas Company in the East Texas district at Greggton, has been transferred to Wink as West Texas district superintendent. EARL KEEFLER, formerly district superintendent at Wink, will replace Mr. Wooten at Greggton.

DAVID J. FLESH, president of the Marion and Harrison Counties Oil and Gas Association, and oil operator in the new Jefferson area, presented evidence at a hearing called by the Texas Railroad Commission to determine whether or not that field should be classified separately from the Rodessa field. Supported by other operators in the newly developed area, Mr. Flesh offered testimony showing that it should be given a separate designation.

K. S. ADAMS, executive vice president of Phillips Petroleum Company, headed a group of officials on a tour of inspection through the recently opened West Saxet field, Nueces County, near Corpus Christi, Tex. His company, in conjunction with L. A. DOUGLAS, was instrumental in discovering the field. The party included F. E. RICE, in charge of the natural gasoline department; A. H. RINEY, chief engineer; C. O. STARK, manager of the land and lease departments; F. W. ALEXANDER, head of the tax department, all of Bartlesville, Okla.; P. C. MURPHY, production superintendent for the Texas and Louisiana district with headquarters in Shreveport, and E. F. GUILDINGER, head of the Standish Pipe Line Company, a subsidiary company. The party left for San Antonio.

R. W. PITCHER, scout for the crude oil purchasing department of the Tide Water Associated Oil Company in the Tyler area of East Texas, suffered the loss of his home by fire in Tyler the evening of January 8. He and MRS. PITCHER and their young son were out for the evening when a defective chimney started the flames.

R. O. GARRETT, Arkansas Fuel Oil Company, Corpus Christi, Tex., has been elected president of the newly organized Benavides Producers Association. Other officers are LEON F. RUSS, Russ Petroleum Company, Houston, Tex., and R. C. BOWLES, Standard Oil Company of Kansas, Houston, vice presidents, and WILLIS STORM, Argo Oil Corporation, San Antonio, secretary-treasurer.

Important Job Finished

R. H. Morrison, of New York, vice president of Bahrein Petroleum Co., Ltd., has completed his most recent assignment demanding experience, judgment and initiative. The job was that of establishing Bahrein's production department in New York when operations in Bahrein Island were assumed by California Texas Oil Co., organized to represent the joint ownership of the Texas Co. and Standard Oil Co. of California. He took a trip to the island to study conditions and more thoroughly to equip himself for the task of administering the production program. He saw much of high interest, but the most really thrilling thing was a cablegram announcing the birth of a son back home. Richard H., Jr., is now a year old.

Blank & Stoller, Inc.

R. H. MORRISON

For six years preceding his election to the Bahrein Petroleum Co. vice presidency Mr. Morrison had managed operations of the Standard of California in its southern district, which included all of Texas and New Mexico.

After graduating from the University of California Law School in 1921 young Morrison joined the law firm of Pillsbury, Madison & Sutro, attorneys for Standard of California. In 1923 he accepted an invitation to join the land and lease division of the company. Two years later he was made superintendent of the division. After five years' service in that post he was sent to Dallas, Tex., as manager of the company's southern division and then was advanced to his present one. Mr. Morrison married Miss Maurine Stevens in Los Angeles in 1928. They have three children.

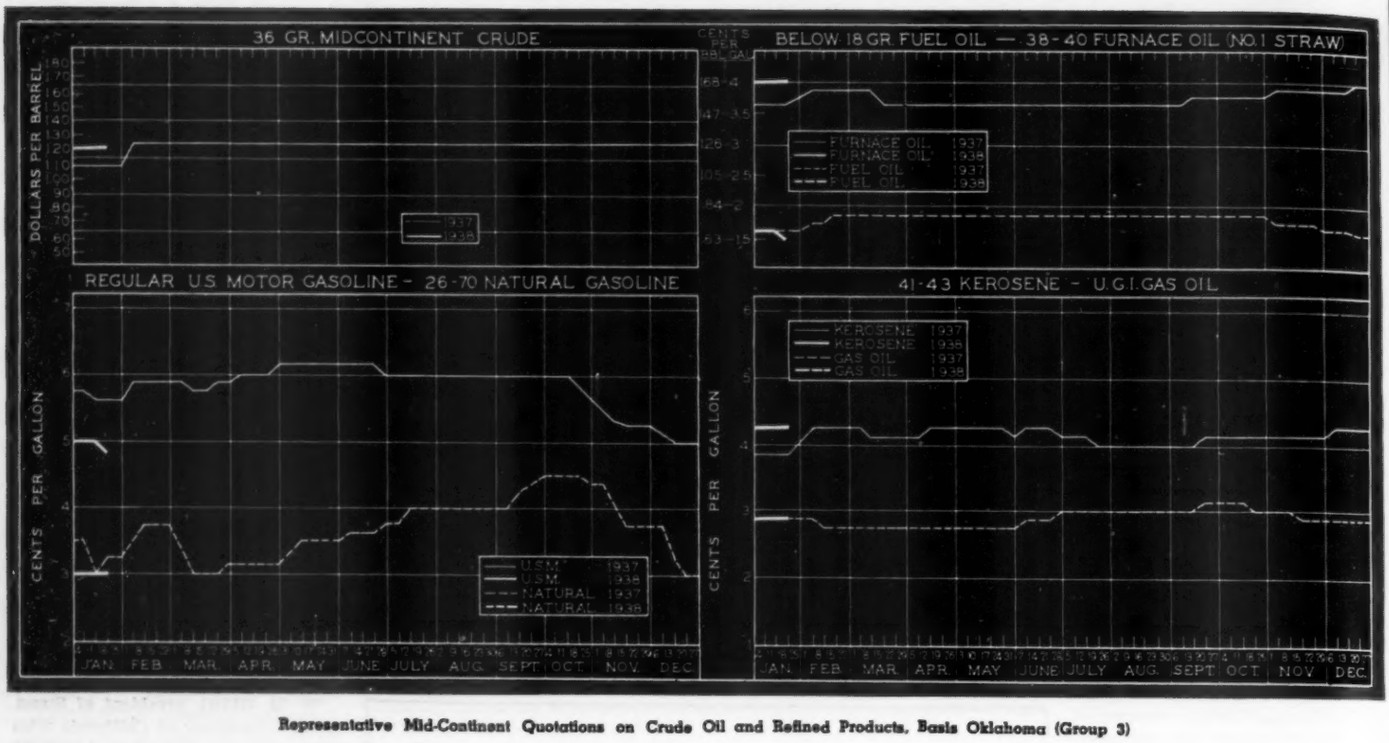
W. H. BERG, president of Standard Oil Company of California with offices in San Francisco, has been elected a director of the Anglo-California National Bank, succeeding the late K. R. Kingsbury.

HERBERT J. SUMMY, formerly field superintendent for Sinclair Prairie Oil Company in the Longview district of East Texas, has been transferred to Midland as assistant division superintendent for that company in West Texas.

WILLIAM G. RANKIN, commissioner for the Louisiana Department of Conservation, predicted a possible increase in Louisiana production allowables early in 1938, citing the discoveries and developments of new production in the state over the past year.

H. A. HEMPHILL, geologist with Magnolia Petroleum Company in Midland, Tex., was elected president of the West Texas Geological Society at its annual business meeting last week. W. D. ANDERSON, district geologist for Amerada Petroleum Corporation, is the new vice president, and WILLIAM C. FRITZ, Skelly Oil Company geologist, secretary-treasurer.

A. G. TALBOT, of Chicago, representing the petroleum exchange, appearing before the Interstate Commerce Commission hearing recently in New Orleans, testified that the proposed freight rate increase for railroads would bring about the construction of additional pipe lines by oil companies. W. D. RICHARDSON, vice president of Cosden Petroleum Corporation, Fort Worth, Tex., who also attended the hearing, asserted that his company, together with Anderson-Prichard Oil Company of Oklahoma City, was considering installation of a line from its West Texas refineries to the Gulf Coast.


36 GR. MIDCONTINENT CRUDE
DOLLARS PER BARREL
BELOW 18 GR. FUEL OIL — 38-40 FURNACE OIL (NO. 1 STRAW)
CENTS PER BBL. GAL.
FURNACE OIL 1937
FURNACE OIL 1938
FUEL OIL 1937
FUEL OIL 1938
REGULAR U.S. MOTOR GASOLINE - 26-70 NATURAL GASOLINE
CENTS PER GALLON
U.S.M. 1937
U.S.M. 1938
NATURAL 1937
NATURAL 1938
41-43 KEROSENE - U.G.I. GAS OIL
KEROSENE 1937
KEROSENE 1938
GAS OIL 1937
GAS OIL 1938
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Representative Mid-Continent Quotations on Crude Oil and Refined Products, Basis Oklahoma (Group 3)

Climbing Stocks of Gasoline Deepen Uneasiness in Group 3 Territory

By T. F. SMILEY

Deepening uneasiness pervaded the Group 3 refinery market this week. Some optimistic analysts declared it still would be possible to bring the nation's gasoline stocks, now clearly excessive, fairly into line with requirements before the opening of next summer's business, and the week's developments pointed to practical efforts toward that end; but meanwhile the figures recording weekly additions to storage continued to reach heights that make them almost fantastic.

Uncertainty Increases Nervousness

Renewed uncertainty over Mid-Continent crude prices was tending to increase nervousness throughout the refinery market. Although the opinion most commonly expressed was that there would be no reduction, there was not the same note of confidence that characterized predictions a few weeks ago. Notwithstanding the absurdly low level of current gasoline prices, general belief is that a cut in crude postings would be accompanied by a further recession in prices of motor fuel and probably other products. A scramble to dump stocks might easily get under way. Realization of the probable consequences of a crude cut is adding power to efforts to avoid one.

Lightening somewhat an otherwise drab outlook was the announcement of the Standard Oil Co. of New Jersey that it would slash its crude runs to stills 15,000 bbls. a day. Although this action is not enough by itself to exert a marked influence on general conditions, it was taken as a hopeful sign, in view of the possibility that other companies, including those operating in the Mid-Continent, might adopt a similar program. If 50 per cent gasoline recovery is accepted as a basis for rough calculation, it is seen that Jersey's reduction in operations will remove about 50,000 bbls. of gasoline from the weekly additions to stocks. If this quantity were multiplied by 25 through cuts by other refiners, the total decrease in weekly gasoline output would be around 1,250,000 bbls. If this curtailment were a reality instead of just some figures on paper, it is believed the problem of gasoline stocks would vanish.

Refined Oil Market Barometer

Adverse conditions have added to the weakness of several products, with continued overproduction of gasoline exciting particular concern. The week's developments indicate refiners may adopt positive measures to deal with this menace. Unseasonably mild weather in extensive areas has modified the demand for fuel oils. Heavy fuels, lubricants, and wax remain slow.

MID-CONTINENT. Gasoline unsettled. Naturals weak. Heating oils less active.

EAST COAST. Fuel oils off. Lubricating oils inactive. Gasoline holding up fairly well.

GULF COAST. Burning oils softer. Gasoline slightly stronger. Prices steady.

CALIFORNIA. Domestic diesels soft. Gasoline unchanged. General market quiet.

PENNSYLVANIA. Kerosene and light fuels fairly firm, but general market lifeless.

CHICAGO. Burning oils in brisk demand. Light fuels holding up well. Gasoline dull.

Another constructive step was that of several major companies which announced they would take from their own wells in Kansas and from the wells of others in that state only 80 per cent of the allowables set by the Kansas Corporation Commission.

Light heating oils had lost the buoyancy which characterized that group last week. Although brokers and sales managers reported prices unchanged, they said it was becoming more difficult to move material. Continued mild weather in wide areas has backed up inventories, and some of the heavier grades were offered at lower quotations. It was agreed that prolongation of the open winter experienced in many parts of the country would be likely to start simultaneous efforts to get rid of stocks, for neither refiners nor jobbers care to be caught with leftover storage of furnace oils at the close of the cold season.

Natural Gasoline Shaky

Natural gasoline was extremely shaky. Refiners were buying sparingly and field stocks were swelling. Export buying alone was satisfactory. In fact there has been a pronounced rise in oversea purchases, but the total is not sufficient to compensate for the slowing down of domestic business. Demand seems unable to catch up with production. Several export inquiries for 18- and 20-pound material are still in the market, but they cannot save the naturals from a sharp decline which seems imminent unless refinery and jobber buying becomes much more active.

Heavy industrial fuels were off. The lubricant group was dull, and wax was weaker.

Definite Measures Are Taken to Halt Increase in Refined Oil Storage

By H. STANLEY NORMAN

NEW YORK, Jan. 18.—Drastic steps to halt the increase of refined products were taken last week by one of the nation's largest companies. First, Standard Oil Co. of New Jersey cut diesel fuel 10 cents per barrel and most burning oils, including kerosene, a quarter of a cent per gallon. The price cut was followed by a decision on the part of Standard of New Jersey to reduce its refinery throughput by nearly 500,000 bbls. for the month of January, a decline of about 4 per cent.

The reduction in fuel oil prices followed two weeks of extreme softness and a much longer period during which business has been disappointing from a volume standpoint. So far the winter has been extremely mild in the Atlantic Seaboard district north of Wilmington and Washington, D. C., the portion of the country which normally consumes more fuel oil than any other two areas combined.

Backing up of fuel oil stocks on the Gulf Coast and price concessions made there for coastwise movement exerted first pressure on the market in the northeast section the early part of January. Up to that time, kerosene and most of the light fuel oils had been in a fairly strong position. Cargo sales on the Gulf Coast for export movement have been reduced during the past month or six weeks, particularly because traders were looking for a break in the market and therefore withheld buying to take advantage of the more favorable terms.

The market break in fuel oils and the more recent effort to stem the tide by a voluntary reduction of refinery operations are all traceable back to surplus production of crude oil. Several observers have been nervous about crude production since the middle or latter part of the summer when stocks began their rise after a long period of consistent declines.

The only fuel oil product in this section unaffected by Standard of New Jersey's reductions last week is bunker C material. Practically all marketers are still offering bunker C fuel oil at $1.25 per barrel in the North Atlantic Coastal district. Diesel oil is now offered at $2.10 per barrel, which the new price 10 cents below the previous posting, made retroactive along with other fuel oil cuts to January 1.

The two top grades of fuel oil were posted at 6 cents per gallon for tankcar and terminal loading while all other grades, including heavy industrial fuel, gas oil and diesel fuel at shore plants were quoted at 5 cents per gallon. The customary concession of one-eighth of a cent per gallon is provided in the new schedule for delivery into barges of resellers. The only exception to the general price schedule is on heavy fuel oil within the Baltimore switching area where the tankcar price is quoted at 4¾ cents per gallon.

Most other marketers immediately joined Standard Oil of New Jersey in lowering the fuel oil price structure in an effort to capture new business. Following the first of last week's fuel oil price reduction temperatures turned downward and were accompanied by the winter's heaviest snowfall in the southern part of New York state. During remainder of last week the temperature level was at or below freezing giving a slight natural stimulus to fuel oil requirements.

Kerosene and the light fuel oils were reported on firm ground in the western Pennsylvania district, but even with the cuts business still lacked the snap normally expected for winter along the Gulf Coast. Several cargoes of fuel oil were reported in hands of Gulf Coast refiners seeking an outlet.

There was no assurance available that other refiners in this section will voluntarily reduce runs as in case of the Standard of New Jersey, but some said they have been considering the statistics and that similar action might be forced upon them before the month is ended unless a sharp change in demand develops. There was little change reported for the week in motor fuel conditions. Movement is sharply curtailed from early fall levels and prices have reacted accordingly. In New York harbor territory, 65 octane gasoline is available in tankcars at 7 cents per gallon in quantity and limited supplies are currently offered at 6⅞ cents per gallon. Western Pennsylvania prices also reacted last week with 65 octane gasoline dropping another one-eighth of a cent per gallon to around 6¾ cents. Motor fuel of less than 63 octane rating is available in western Pennsylvania at 4¾ cents per gallon with occasional sales reported at 4⅝ cents.

Lubricating oils are still under pressure both on the Gulf Coast and in Pennsylvania. Bright stock is the only lubricating material holding its own. Neutral oils are moving only in limited quantities and against strong resistance from jobbers. The 200 viscosity, No. 3 color neutrals are offered between a range of 17 and 21 cents per gallon, depending on the pourpoint. Generally speaking, the prevailing neutral prices are off from 5 to 7½ cents per gallon from those prevailing at the start of the winter season.

The rise in tanker rates which moved up about 5 cents per barrel in the last three weeks of December and the first two of January is partially responsible for dullness of the coastwise and export market prevailing on the Gulf Coast. With comparatively mild winter temperatures prevailing, jobbers and dealers in the northern Atlantic Coast section are in most instances not pressed to replace stocks. Even with prices moving into lower ground, the northern buyers are not rushing into the market for new supplies largely because of the existing higher transportation costs. In order to take advantage of the lower cargo price quotations, the buyers must hold out for either another slash in the products market or for a weakening of the tanker charter rates.

Movement of gasoline against contracts has been holding up fairly well, but open market trading has been almost completely missing. In fact refiners find themselves the victims of weather conditions. In several parts of the country temperatures have been too low to encourage more than essential automobile driving while at the same time too high to bring heavy fuel demand.

While the Standard of New Jersey is the first in this area to confirm a policy of restricting refinery runs, the same purpose has been accomplished in the Mid-Continent area by voluntary restriction of crude purchases in Kansas by at least two pipe line companies. In confirming reports that

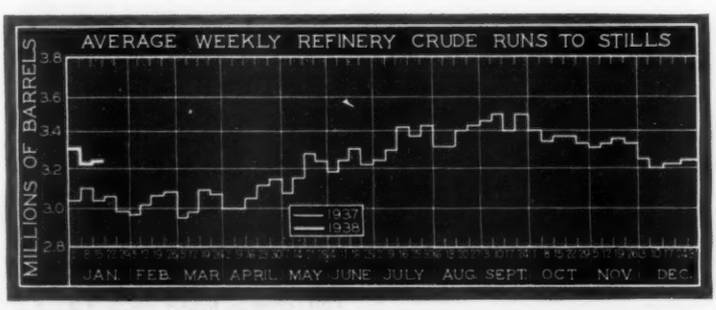
(Continued on Page 152)

A. P. I. Weekly Refinery Statistics

Week Ending January 15, 1938

	Capacity reporting (per cent)	Daily crude runs (bbls.)	Total gasoline stocks	Gas oil and fuel oil stocks
East Coast	100.0	512,000	19,124,000	12,041,000
Appalachian	88.4	107,000	3,128,000	1,166,000
Indiana, Illinois, and Kentucky	92.4	429,000	13,170,000	6,796,000
Oklahoma, Kansas, and Missouri	84.7	246,000	7,035,000	3,617,000
Inland Texas	56.6	147,000	2,546,000	1,755,000
Texas Gulf	95.7	724,000	11,740,000	10,969,000
Louisiana Gulf	96.6	138,000	2,691,000	3,582,000
North Louisiana and Arkansas	63.7	39,000	430,000	476,000
Rocky Mountains	69.7	47,000	1,855,000	687,000
California	90.9	535,000	14,628,000	75,073,000
Total reported	89.0	2,924,000	76,347,000	116,162,000
Estimated unreported	.....	316,000	4,600,000	2,800,000
*Estimated total	.....	3,240,000	80,947,000	118,962,000
*Estimated total previous week	.....	3,210,000	79,331,000	119,146,000
*January 16, 1937	.....	3,045,000	66,559,000	104,841,000

*Bureau of Mines, currently estimated.



Stocks of Crude Oil in the United States

(BUREAU OF MINES ESTIMATES)

Week ending January 8, 1938	303,078,000 barrels
Week ending January 1, 1938	303,468,000 barrels
Week ending January 9, 1937	287,770,000 barrels

RETAIL OIL MARKETS

Tank-wagon and filling station prices on gasoline and kerosene furnished by the larger marketing firms

Prices as of January 18, 1938

Taxes

The gasoline quotations given in the following tables include the 1-cent federal tax, as well as state, county and city taxes. The gasoline is the regular or standard grade. In most areas a third grade and a premium grade are also available.

Standard Oil Co. (Indiana)

	Gasoline Tank wag.	Gasoline Dlr.	Gasoline Inc. tax	Kero. tank wag.
Chicago, Ill.	15.3	13.3	4.0	10.2
Decatur	15.3	13.8	4.0	10.2
Joliet	15.3	13.8	4.0	10.2
Peoria	15.3	13.8	4.0	10.2
Quincy	15.1	13.6	4.0	10.0
Davenport, Ia.	15.3	13.8	4.0	‡13.2
Des Moines	15.1	13 6	4 0	‡11 0
Mason City	15 4	13 9	4 0	‡13.3
Sioux City	15.3	13.8	4.0	‡13.2
Duluth, Minn.	17.0	15.5	5.0	10.9
Mankato	16.7	15 2	5 0	9 5
Minneapolis	16.7	15.2	5.0	10 6
Lacrosse, Wis	16.7	15.2	5.0	10.6
Green Bay	17.0	15.5	5.0	10.9
Milwaukee	16.5	15.0	5.0	10.4
Detroit, Mich.	15.1	13.6	4.0	9.8
Grand Rapids	16.3	14 8	4.0	11.0
Saginaw	16.1	14.6	4.0	9.1
Evansville, Ind.	16 8	15.3	5.0	†10.7
Indianapolis	16 9	15.4	5.0	†10.8
South Bend	17.2	15.7	5 0	†10.2
Fargo, N. Dak.	16 7	15.2	4.0	11.6
Minot	17 9	16.4	4.0	12.8
Huron, S. Dak.	17.1	15.6	5.0	11.0
Kans. City, Mo.*	14.6	13.1	4.0	8.5
St. Louis*	14 9	13.4	4.0	9.8
St. Joseph	14.6	11.4	4.0	9.0
Wichita, Kans.	14.1	12.4	4.0	8.5

*State tax 2 cents, 1-cent city tax and 1-cent federal tax. †Does not include 4-cent state tax. ‡Iowa kerosene prices include 3-cent state tax.

(Exclusive of state general sales taxes, except Indiana and South Dakota.)

Discounts to commercial consumers: On purchases per month off tank-wagon prices: 1,000 gallons or more, 1.5 cents off; minimum delivery 25 gallons.

Stanolex Fuel Oil in Chicago

Effective Dec. 7, 1936, f.o.b. Chicago tank-wagon prices: Range oil, 1-99 gallons, 8.8 cents; 100-149 gallons, 7.8 cents; 150 gallons and over, 7.3 cents. Stanolex No. 1, 1-99 gallons, 8.8 cents; 100-149 gallons, 7.8 cents; 150 gallons and over, 7.0 cents. Stanolex furnace oil, 1-149 gallons, 7.8 cents; 150 gallons and over, 7.0 cents. Stanolex A, 1-399 gallons, 5.75 cents; 400 gallons and over, 4.75 cents. Stanolex B, 1-799 gallons, 5.75 cents; 800 gallons and over, 4.75 cents.

Atlantic Coast District

STANDARD OIL CO. OF NEW JERSEY

	Gasoline Tank wag. dlr.	Gasoline Tank car con'r.	Gasoline Inc. tax	Kero. tank wag.
Atl'tic City, N. J.	12.75	11.25	4.0	9.0
Newark	12.75	11.25	4.0	9.0
Annapolis, Md.	14.85	13 35	5.0	9.5
Baltimore	14.25	12.75	5.0	9.0
Cumberland	16.65	14.15	5.0	10.0
Wash'g'n, D. C.	12.5	11.0	3.0	9.5
Danville, Va.	17.45	14.95	6.0	12.9
Norfolk	16.25	13.75	6.0	11.5
Petersburg	16.55	14.05	6.0	11.7
Richmond	16.55	14.05	6.0	11.7
Roanoke	17.75	15.25	6.0	12.9
Charles'n, W. V.	17.05	14.55	6.0	12.6
Parkersburg	16.35	13.85	6.0	11.2
Wheeling	16.25	14.85	6.0	12.2
Charlotte, N. C.	18.65	16.15	7.0	12.6
Hickory	19.15	16.65	7.0	13.0
Mt. Airy	18.95	16.45	7.0	12.8
Raleigh	18.25	15.75	7.0	12.1
Salisbury	18.75	16.25	7.0	12.7
Charleston, S. C.	17.25	14.75	7.0	11.1
Columbia	18.25	15.75	7.0	12.1
Spartanburg	18.95	16.45	7.0	12.9

Price basis to commercial consumers, effective March 8, 1937, in Maryland, District of Columbia, and in Arlington and Fairfax counties in Virginia; and March 12 in New Jersey: To contract accounts purchasing at least one full compartment at time by hose connection, on yearly purchases: From 2,500 to 100,000 gallons consumer tank-wagon price at time and place of delivery; 100,000 gallons per year, consumer tankcar price plus .5 cent per gallon. Consumer tank-wagon price generally will be equivalent to dealer tank-wagon price less .5-cent per gallon.

Effective May 15, 1937, in North and South Carolina, West Virginia and Virginia (except Arlington and Fairfax counties): Commercial consumers taking deliveries of 50 gallons (W. Va., 100 gallons) or more at one time will be billed at posted consumer tank-wagon price. Accounts taking deliveries of less than 50 gallons (W. Va., 100 gallons) will be billed at 4 cents per gallon over posted consumer tank-wagon price. Generally the posted consumer tank-wagon price will be equivalent to the dealer price less .5 cent per gallon.

Discount for kerosene, 1 cent off tank-wagon price for 25 gallons or more under contract (contract not necessary in Baltimore) except no discount in New Jersey

Southern District

STANDARD OIL CO. OF KENTUCKY

	Gasoline Tank wag.	Gasoline Net dlr.	Gasoline Inc. tax	Kero tank wag.
Atlanta, Ga.	21.0	18.0	7.0*	†14.0
Augusta	21.0	18.0	7.0	*14.0
Macon	21 0	18 0	7.0	*14 5
Savannah	19.5	16.5	7.0	*12.0
Birm'ham, Ala.	22.0	19.0	8.0	12.0
Mobile	22 0	19 0	9.0	11.0
Montgomery	22.0	19.0	9.0	†13.0
Jackson, Miss.	20.0	17.0	7.0	*13.0
Vicksburg	20.0	17.0	7.0	*13.0
Jacks'ville, Fla.	22.5	17.5	8.0	†11.0
Miami	20.5	17.5	8.0	†12.5
Pensacola	22.5	19.5	9.0	12.0
Tampa	20.5	17.5	8.0	10.5
Lexington, Ky.	19.5	16.5	6.0	11.0
Covington	18.5	15.5	6.0	11.0
Louisville	19.0	16.0	6.0	10.5
Paducah	19.5	16.5	6.0	10.0

Price basis to tank-wagon consumers: Effective January 4, 1937, 3 cents per gallon below tank-wagon price. Kerosene prices in all states subject to 2 cents discount except in Kentucky where prices are net.

*Includes 1-cent state tax. †Subject to 2-cent discount.

Montgomery, Ala., has a county tax of 1 cent per gallon, and a city tax of 1 cent per gallon on gasoline, in addition to state tax; and 1 cent per gallon on kerosene. Mobile, Ala., has a city gasoline tax of 2 cents per gallon; Birmingham, Ala., has a city gasoline tax of 1 cent per gallon; Pensacola has a city gasoline tax of 1 cent.

Rocky Mountain District

CONTINENTAL OIL CO.

	Gasoline Dealer	Gasoline Inc. tax	Kero. tank wag.
Denver, Colo.	15.0	5 0	11.5
Grand Junction	19.0	5.0	15.0
Pueblo	16.0	5.0	10.5
Casper, Wyo.	17.0	5.0	11.5
Cheyenne	16 0	5.0	13.0
Butte, Mont.	19.5	6.0	15.5
Billings	19.5	6.0	15.5
Helena	19.5	6.0	15.5
Great Falls	19.5	6.0	15.5
Salt Lake City, Utah	19.5	5.0	16.0
Twin Falls, Ida.	21.0	6.0	18.0
Boise	21.5	6 0	18.0
Albuquerque, N. M.	17.5	*6.5	12.0

*Includes city tax of one-half cent.

Ohio

STANDARD OIL CO. OF OHIO

	Gasoline Tank wag. con'r.	Gasoline Di-vided dlr.	Gasoline Inc. tax	Kero. tank wag.
Ohio points	16.0	15.00	5.0	*13.5

*Includes state tax of 1 cent.

New York and New England

SOCONY-VACUUM OIL CO., INC.

	Gasoline Tank wag. dlr.	Gasoline Tank car con'r.	Gasoline Inc. tax	Kero tank wag.
Albany, N. Y.	14.5	12.5	5.0	9.0
*Met. N. Y.:				
M'nh't'n, Br'nx	14.5	12.5	5 0	8.75
Staten Island	14 5	12.5	5 0	8.75
Q'ns. & Brklyn	14.5	12 5	5 0	8.75
Buffalo	14.0	13 04	5 0	7.5
Rochester	15.0	13.17	5.0	8.5
Syracuse	14 5	13 12	5.0	9 0
Boston, Mass.	13 00	11 5	4.0	8 0
Portland, Me.	14 5	12.7	5.0	8.75
Manch'ter, N. H.	15.0	13 0	5.0	9.0
Burlington, Vt.	14.5	12.9	5.0	9.5

*Does not include 2 per cent city sales tax which is calculated on basis of net retail price exclusive of state and federal taxes.

Price basis to undivided dealer: Posted dealer tank-wagon price less .5 cent. Price basis to commercial consumer: Effective Nov. 15, 1936, monthly purchases of 25,000 gallons and over, consumer tankcar prices at delivery point plus .5 cent per gallon; monthly purchases of 5,000 to 25,000 gallons, undivided dealer price at delivery point; monthly purchases under 5,000 gallons, pay divided dealer tank-wagon price at delivery point.

Pacific Coast Territory

STANDARD OIL CO. OF CALIFORNIA

	Gasoline Tank wag.	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
San Francisco	17.5	18 5	4.0	11.5
Los Angeles	17.0	18.0	4.0	10.0
Fresno, Calif.	18.5	19.5	4.0	12.5
Phoenix, Ariz.	21.0	22.0	6.0	‡17.0
Reno, Nev.	20.0	21.0	5.0	13.0
Portland, Ore.	20.0	21.0	6.0	13.5
Seattle, Wash.	20 0	21.0	6.0	13.5
Spokane	22.5	23.5	6.0	16.0
Tacoma	20.0	21.0	6.0	13.5

‡Includes 5-cent state tax.

Discounts to dealers: On gasoline, off tank-wagon price, to 100 per cent dealers, 3 cents; to split dealers, 2 cents. To commercial consumers: on tank-wagon price: on single deliveries of 40 gallons and over, advance quantity discount extended at time of delivery, 3 cents. Service station schedule applies on single deliveries less than 40 gallons. On kerosene in tankcar, transport truck and trailer delivery, 3 cents off tank-wagon price; plant deliveries to jobbers, 2.5 cents below tank-wagon.

Nebraska

STANDARD OIL CO. OF NEBRASKA

	Gasoline Tank wag.	Gasoline Dlr.	Gasoline Inc. tax	Kero. tank wag.
Omaha	17 7	16 2	6 0	10 5
McCook	18.4	15.0	6.0	11.2
Norfolk	18.1	16.6	6.0	10.9
North Platte	18.5	17.0	6.0	11.3
Scotts Bluff	19.2	16.0	6.0	12.0

Discounts to commercial consumers for tank-wagon deliveries covered only by standard commercial consumers contract, effective Jan. 1, 1935.

Central South District

STANDARD OIL CO. OF LOUISIANA

	Gasoline Tank wag. dlr.	Gasoline Tank car con'r.	Gasoline Inc. tax	Kero. tank wag.
N. Orleans, La.	19.75	17.25	*10.0	†12.0
Baton Rouge	17.75	15.25	8.0	12.0
Alexandria	18 25	15 75	8.0	10.5
Lafayette	18.75	16.25	8.0	13.0
Lake Charles	18.75	16.25	8.0	12.5
Shreveport	17.25	14.75	8.0	9.5
Kn'xv'le, Tenn.	20.75	18.25	8.0	14.0
Memphis	18.75	16.25	8.0	12.0
Chattanooga	20.25	17.75	8.0	13.5
Nashville	19.75	17.25	8.0	11.5
Bristol	19.50	18.25	8.0	14.5

*Includes 2-cent parish tax. †Includes 1-cent parish tax and 1-cent state tax.

Price basis to commercial consumers: Effective May 15, 1937, deliveries of 50 gallons or more in one delivery takes posted consumer tank-wagon price. Accounts taking deliveries of less than 50 gallons at one time pay posted consumer tank-wagon price plus 4 cents per gallon. Generally, the posted consumer tank-wagon price will be equivalent to the dealer price less .5 cent per gallon.

Louisiana kerosene prices include 1 cent state tax.

Pennsylvania, Delaware and Part of New England

ATLANTIC REFINING CO.

	Gasoline Tank wag. dlr.	Gasoline Tank car con'r.	Gasoline Inc. tax	Kero. tank wag.
Philadelphia, Pa.	13.25	12.25	5.0	10.5
Pittsburgh	15.0	13.0	5.0	11.0
Allentown	14.25	12.75	5.0	11.0
Erie	14.5	13.0	5.0	10.0
Scranton	14.5	13.0	5.0	11.0
Altoona	15.0	13.0	5.0	11.0
Dover, Del.	14.5	....	5.0	11.0
Wilmington	14.0	....	5.0	11.0
Springf'd, Mass.	13.5	....	4.0	8.5
Worcester	14.3	....	4.0	9.0
Hartford, Conn.	13.6	....	4.0	8.5
New Haven	13.5	....	4.0	8.0
Providence, R. I.	13.3	....	4.0	8.5

Price basis to undivided dealers, dealer tank-wagon price less .5 cent per gallon. Price basis to commercial consumers in Pennsylvania and Delaware, effective March 11, 1937: Consumers under contract using 100,000 gallons or more per year full compartment hose deliveries, tankcar plus .5 cent. Consumers under contract using less than 100,000 gallons per year compartment hose deliveries, undivided dealer price. Consumers under contract less than full compartment delivery, consumers not under contract less than full compartment delivery, and consumers not under contract full compartment delivery, divided dealer price. Less than 25 gallons, tank-wagon delivery, 4 cents per gallon above undivided dealer price.

Oklahoma and Arkansas

CONTINENTAL OIL CO.

	Gasoline Dealer	Gasoline Inc. tax	Kero. tank wag.
Muskogee, Okla.	14.5	5.0	7.0
Oklahoma City	14.0	5.0	8.0
Tulsa	14.0	5.0	6.0
Ft. Smith, Ark.	14.75	5.0	8.0
Little Rock	17.25	7.5	9.5
Texarkana	14.0	5.0	8.5

Texas

	Gasoline Tank wag.	Gasoline Serv. sta.	Gasoline Inc. tax	Kero. tank wag.
Dallas, Tex.	14.0	18.5	5.0	8.0
Fort Worth	14.0	18.0	5.0	8.0
Houston	14.5	19.0	5.0	8.0
San Antonio	14.5	18.5	5.0	8.0

Naphtha

STANDARD OIL CO. (INDIANA)

	Tank-wagon*
Oleum spirits	15.7
V.M.&P. naphtha	16.0
Cleaners' naphtha	15.0
Stanisol	15.0

*Prices include 3-cent Illinois tax, but not 1-cent federal tax or 2 per cent retail occupational tax.

Prices f.o.b. Chicago. Each price subject to discount of 1 cent per gallon for 150 gallon lots if covered by contract.

Canada*

3 Star Imperial Gasoline
IMPERIAL OIL, LTD.

	Tank-wag.	Inc. tax	Kero. tank wag.
Halifax, N.S.	24 0	8.0	18.5
St. John, N.B.	24.0	8.0	18.5
Montreal, Que.	21.0	6.0	17.5
Toronto, Ont.	22.0	6.0	17.0
Hamilton, Ont.	22.0	6.0	17.0
Winnipeg, Man.	27.5	7.0	20.7
Brandon, Man.	29 8	7 0	22.8
Regina, Sask.	27.0	7.0	22.0
Saskatoon, Sask.	29 8	7 0	24.8
Edmonton, Alta.	26.5	7.0	21.5
Calgary, Alta.	24.0	7.0	19.0
Vancouver, B.C.	23.0	7.0	23.0

*Imperial gallon used in Canada.

Divided dealers pay tank-wagon price. Discount to undivided dealers, 1 cent below tank-wagon price. In maritime provinces both divided and undivided dealers pay tank-wagon price.

Retail Price Changes

Standard Oil Co. of Kentucky January 6 advanced tank-wagon kerosene 2 cents in Atlanta; January 6 advanced tank-wagon and dealer gasoline .5 cent in Savannah, Jacksonville, Pensacola, and Tampa; January 8 advanced tank-wagon kerosene 1 cent in Jacksonville.

Standard Oil Co. of Nebraska January 8 reduced dealer gasoline 1.9 cents in McCook.

New York Market

(Continued from Page 151)

crude runs to stills would be curtailed for duration of January and as much longer as conditions justified, the Standard of New Jersey spokesman said it had not been determined exactly how the plan will effect crude deliveries. The inference was left that crude runs may be continued unchanged provided it is not necessary to continue the processing restrictions over too long a period.

There is, however, a general feeling among eastern oil executives that gasoline stocks can yet be brought into reasonable line by March 1 with consumption prospects what they are, but that it will require rather drastic and prompt action. Much attention of eastern oil men will focus on the Interstate Compact meeting this week and they are hoping that action may be taken to reassure the industry over the question of crude production for remainder of the winter.

PRICES OF REFINED PRODUCTS

All quotations f.o.b. plant in cars for interstate or export movement except as otherwise noted

Prices as of January 18, 1938

The following quotations are exclusive of the federal excise taxes of 1 cent a gallon on gasoline and 4 cents on lubricating oils.

Refinery Gasoline

OKLAHOMA (Group 3)—

U. S. Motor grades:		
62 oct. and below	.03⅞	.04
63-66 octane	.04⅜	.04½
67-69 octane	.04⅝	.04⅞
70-72 octane (regular)	.04⅞	.05
60-62 400 grades:		
62 oct. and below	.03⅞	.04
63-66 octane	.04⅜	.04½
67-69 octane	.04⅝	.04⅞
70-72 octane (regular)	.04⅞	.05
64-66 375	.04½	.04⅝
68-70 360	.04⅞	.05⅛

NORTH TEXAS—

U. S. Motor grades:		
62 octane and below	.03⅞	.04
63-66 octane	.04⅜	.04½
67-69 octane	.04⅝	.04⅞
70-72 octane (regular)	.04⅞	.05
60-62 400	.04	.04¼
64-66 375	.04½	.04⅝

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)

U. S. Motor grades:		
62 octane and below	.04½	.04¾
63-66 octane	.04⅝	.04⅞
67-69 octane	.05	.05¼
70-72 octane (regular)	.05½	.05⅝

ARKANSAS (Ark., N. La., Miss. del.)—

U. S. Motor grades:		
62 octane and below	.04⅜	.04⅝
67-69 octane	.05	.05¼
70-72 octane (regular)	.05½	.05¾

CHICAGO (Based on Group 3)—

U. S. Motor grades:		
62 octane and below	.04	.04¼
63-66 octane	.04⅜	.04⅝
67-69 octane	.04⅝	.05
70-72 octane (regular)	.05	.05¼
60-62 400 grades:		
62 octane and below	.04	.04¼
63-66 octane	.04⅜	.04⅝
67-69 octane	.04⅝	.04⅞
70-72 octane (regular)	.05	.05¼
64-66 375	.04¾	.05
68-70 360	.05	.05¼

PENNSYLVANIA (inland refineries)—

58-60 U. S. Motor:		
Below 60 octane	.04¾	.04⅞
60-64.9 octane	.06½	.06¾
65-70 octane	.06¾	.07
64-66 390	.05½	.05¾
68-70 350	.05¾	.06

CALIFORNIA (domestic movement)—

54-58 U. S. Motor	.07½	.08½
58-60 400, 65 oct. and higher	.08¼	.09¼

EAST COAST (Domestic)—

U. S. Motor, 60-64.9 octane:		
New York (Bayonne)	.07	.07¼
Philadelphia	.07	.07¼
Boston	.07½	.07¾
Baltimore	.07	.07¼
Charleston, S. C.	.07	.07¼
U. S. Motor, 65 and above:		
*New York (Bayonne)	.07¼	.07⅜
Philadelphia	.07⅛	.07⅜
Boston	.07¼	.07⅝
Baltimore	.07⅛	.07½
Charleston, S. C.	.07¾	.08

*All grades of gasoline one-eighth to one-fourth cent less for barge shipments. New York harbor prices are for New York and New England delivery. Prices for New Jersey delivery one-fourth cent lower.

GULF COAST (domestic)—

U. S. Motor grades:		
Below 60 octane	.05¼	.05½
60-64.9	.05⅝	.05½
65 octane and higher	.05½	.05⅝

Naphtha

PENNSYLVANIA (inland refineries)—

50-52 450 (blending)	.04¾	.04⅞
52-54 450 (blending)	.04¾	.04⅞
54-56 450 (blending)	.04¾	.04⅞

Natural Gasoline

OKLAHOMA (Group 3)—

Grade 26-70		.03
Grade 18-55	.03½	.03⅝

NORTH TEXAS—

Grade 26-70		.03
Grade 18-55	.03½	.03⅝

CALIFORNIA—

75-85 375-390	.06½	.07½

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

Grade 26-70		.03⅜

Tractor Fuel

OKLAHOMA (Group 3)—

40-42 gr., 315-325 l.b.p., 110 flash, 540-550 e.p.	.04¼	.04⅜
41-43 gr., 300-520 e.p., 110-125 flash, 500-520 e.p.	.04¼	.04½
46-48 gr., 210-230 l.b.p., 480 max. e.p.	.04¾	.04⅞

Kerosene

(All kerosene water white)

OKLAHOMA (Group 3)—

41-43	.04¼	.04⅜
42-44	.04⅜	.04½

NORTH TEXAS—

41-43	.04¼	.04⅜

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

41-43	.04½	.04⅝

ARKANSAS (Ark., N. La., Miss. del.)—

41-43		.04⅝

PENNSYLVANIA (inland refineries)—

45	.05½	.05⅝
46	.05⅝	.05¾
47	.05¾	.05⅞

CHICAGO (Based on Group 3)—

41-43	.04⅛	.04⅜
42-44	.04⅜	.04⅝

CALIFORNIA (Pac. Coast market)—

38-43 high burning test	.06	.06¾

NEW YORK (Bayonne, N. J.)—

41-43		.06

***GULF COAST (domestic)—**

41-43	.05	.05⅛

*Barge price one-eighth cent lower.

Furnace Oil

OKLAHOMA (Group 3)—

No. 1 prime white, 38-42	.04⅛	.04¼
No. 1 straw, 38-40	.04	.04⅛
No. 2 straw, 32-36	.03⅞	.04
No. 2 dark, 32-36	.03¾	.03⅞
No. 3 zero to 15, 28-32	.03½	.03⅝
No. 3, 15 and above, 28-32	.03	.03⅛

NORTH TEXAS—

No. 1 prime white, 38-42	.04⅛	.04¼
No. 1 straw, 38-40	.04	.04⅛

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

No. 2, 32-36	.03⅝	.03¾

ARKANSAS (Ark., N. La., Miss. del.)—

No. 2, 32-36	.03⅞	.04

CHICAGO (Based on Group 3)—

No. 1 prime white, 38-40	.04⅛	.04¼
No. 1 straw, 38-40	.04	.04⅛
No. 2 straw, 32-36	.03⅞	.04
No. 2 dark, 32-36	.03⅝	.03⅞
No. 3, zero to 15, 28-32	.03½	.03⅝
No. 3, 15 and above, 28-32	.03	.03⅛

NEW YORK (Bayonne, N. J.)—

*No. 1		.06
*No. 2		.05¼
*No. 4		.05

*Barge deliveries one-eighth to one-fourth cent under above tankcar price.

Gas Oil and Fuel Oil

(Gas oil per gal.; fuel oil per bbl.)

OKLAHOMA (Group 3)—

U.G.I. gas oil	.02⅞	.03
No. 4, low cold test, 24-28	1.10	1.15
No. 4, 15 and above, 24-28	.90	.95
No. 5, low cold test, 18-22	.80	.85
Below 18 fuel oil, industrial	.67½	.72½

NORTH TEXAS—

U.G.I. gas oil	.02⅞	.03
No. 4, low cold test, 24-28	1.10	1.15
No. 5, low cold test, 18-22	.80	.85
Below 18 fuel oil, industrial	.67½	.72½

NORTH LOUISIANA (Ark., N. La. and Miss. delivery)—

10-14 fuel oil, industrial	.80	.85

CHICAGO (Based on Group 3)—

U.G.I. gas oil	.03	.03⅛
No. 4, low cold test, 24-28	1.10	1.15
No. 4, 15 and above, 24-28	.90	.95
No. 5, low cold test, 18-22	.80	.90
No. 5, 15 and above (18-22)	.77½	.85
No. 6, low cold test, 10-16	.72½	.80
No. 6, 15 and above (10-16)	.57½	.62½

PENNSYLVANIA (inland refineries)—

36-40	.04⅞	.05⅛

CALIFORNIA

Los Angeles:		
30-34 gas oil, per bbl.	1.55	1.70
24 plus diesel, per bbl.	1.50	1.70
24 plus diesel (bunkers)	1.60	1.70
12-16 (bunkers at tidewater)	.90	1.00
10-16 (cargo lots)	.88	.95
12-17 (tankcars)	.85	.95
10-17 (high sulfur)	.65	.95
San Joaquin Valley:		
10-18 (tankcars)	.60	.85
24 plus diesel, per bbl.	1.50	1.65
San Francisco:		
24 plus diesel, per bbl.	1.55	1.70
24 plus diesel (bunkers)	1.60	1.70
10-16 (bunkers)	1.00	1.05

GULF COAST—

28-30 gas oil	.04½	.04⅝
28-30 diesel (bunkers)		1.90
Bunkers (bulk cargoes)		.85
Bunker C (bunkers)		1.05

NEW YORK (Bayonne, N. J.)—

27 plus, gas oil		.05
28-30 diesel (lighterage 6¼c per bbl.)		2.10
28-30 diesel (tankcars)		.05
Bunker C (to ocean-going ships in N. Y. harbor)		1.25
Industrial fuel (tankcars)	.04½	.04¾

Lighterage charge 5c bbl. additional.

Bright and Steam Refined

OKLAHOMA (Group 3)—

Bright Stocks:		
190-200 D, 15-25		.19
150-160 D, 0-10		.16
150-160 D, 15-25		.15
150-160 E, 15-25		.14½
100-110 D, 0-10		.14½
Steam refined:		
631 green (treated)		.13½
600 dark green (untreated)		.05

PENNSYLVANIA—

Bright Stocks (Pennsylvania Grade No. 8 color, 140-150 at 210, 545-550 flash):		
10 pour test	.18	.19
15 pour test	.17	.18
20 pour test	.16	.17
25 pour test	.15	.16
Steam refined:		
600	.07	.08
650	.10½	.11½
600 Pennsylvania flash	.11	.12
630 flash	.14	.15
600 Warren E filtered	.13	.14

Neutral Oil

(Vis. at 100° F. except Pennsylvania and color N.G.A.)

OKLAHOMA (Group 3)—

Zero to 10 Cold Test:		
150-3		.09
180-3		.10
180-4		.09½
200-3		.10½
200-4		.10
250-3		.11½
250-4		.11
280-3		.12½
280-4		.12
300-3½		.13
400-3½		.14
100-2½ paraffin oil		.06
15-20 Cold Test:		
200-3		.10
200-4		.09½
250-3		.11
250-4		.10½
280-3		.12
280-4		.11½

GULF COAST—

Pale Oils:		
200-3	.07	.07¼
300-3	.07½	.07¾
500-3½	.08½	.08¾
750-3½	.08⅝	.09¼
1,200-3½	.09½	.09¾
1,500-4	.09¾	.10
Red Oils:		
200-5-6	.07¼	.07½
300-5-6	.07¼	.07½
500-5-6	.08	.08½
750	.08¾	.09
1,200-5-6	.09¼	.09½

CALIFORNIA (moving to dom. market)—

Pale Oils:		
100-2½-3	.07¼	.08
200-2½-3	.07¼	.08
300-2½-3	.07¼	.08
400-3-4	.07¼	.08
450-3-4	.07¼	.08
550-3-4	.09	.11
600-3-4	.09	.11
Red Oils:		
200-4-5	.07¼	.08
300-5-6	.07¼	.08
350-5-6	.09¼	.11½
400-5-6	.09¼	.11½
450-5-6	.09¼	.11½
500-5-6	.09¼	.11½
600-5-6½	.09¼	.11½
700-6½ plus	.09¼	.11½
750-6½ plus	.09¼	.11½
900-6½ plus	.09¼	.11½

PENNSYLVANIA—

150 vis. at 70° F. color, 400-405 flash:		
Zero pour test	.19	.19½
10 pour test	.18	.18½
15 pour test	.17½	.18
25 pour test	.16½	.17
180 vis. at 70° F., 3 color:		
25 pour test	.17½	.18
200 vis. at 70° F., 3 color:		
Zero pour test	.21	.21½
10 pour test	.20	.20½
15 pour test	.19½	.20
25 pour test	.18½	.19

Wax and Petrolatum

(Prices per pound)

OKLAHOMA (Group 3)—

124-126 (a.m.p.) w.c. scale	.02¾	.02⅞

PENNSYLVANIA (inland refineries)—

122-124 (a.m.p.) w.c. scale	.0275	.0280
124-126 (a.m.p.) w.c. scale	.0275	.0280

NEW YORK—

Wax in bags fully refined:		
122-125 (a.m.p.) wax		.0445
125-127 (a.m.p.) wax		.0455
128-130 (a.m.p.) wax		.0480
130-132 (a.m.p.) wax		.0505
133-135 (a.m.p.) wax		.0535
135-137 (a.m.p.) wax		.0560
124-126 (a.m.p.) w.s.	.0295	.0300
124-126 (a.m.p.) y.s.	.0265	.0280
Petrolatum in barrels, carload lots:		
Dark green		.01⅞
Amber	.02⅞	.03
Extra amber	.03	.03⅛
Lily white	.06⅝	.06¾
Snow white	.07¾	.07⅞
Cream	.05⅝	.05¾

Export Prices

GASOLINE

GULF COAST—

U. S. Motor	.05⅜	.05½
60-62 400	.05⅝	.05⅛
61-63 390		.05⅝
64-66 375		.05¾

LOS ANGELES—

U. S. Motor grades:		
55-65 octane	.05¾	.06
65-69 octane		.06¼
Above 69 octane		.06½

KEROSENE

GULF COAST—

41-43 prime white		.05⅛
41-43 water white		.05¼
44 water white		.05⅝

LOS ANGELES—

41-43 water white	.05	.05¼

LUBRICANTS

(Pennsylvania Grade)

NEW YORK (f.o.s. in bbls.)—

Cylinder Stocks:		
600 Warren E	.21½	.22
600 S.R. unfiltered	.16½	.17
630 S.R. unfiltered	.21	.21½
600 flash, S.R.	.21½	.22
630 flash, S.R.	.25½	.26
Bright Stocks:		
8 color	.23½	.24
6½ plus color in dilution	.23	.23½

NEUTRAL OIL

200-3 color	.30	.30½
150-3 color	.25½	.26

PARAFFIN WAX

NEW YORK (prices per pound)—

123-126 a.m.p.		.04125
125-127 a.m.p.		.0425
128-130 a.m.p.		.0450
133-135 a.m.p.		.0525
135-137 a.m.p.		.0550
Crude Scale:		
124-126 w.s.	.0295	.0300
124-126 y.s.	.0265	.0280

CRUDE OIL PRICES

Oklahoma, Kansas, North Central and East Central Texas

(January 28, 1937)

East Texas (May 22, 1937)*	$1.35
Van, Tex.†	1.10
Camp Hill, Tex.	1.27
Cass County, Tex.‡	1.25
Talco	.73
Altus and Tipton, Okla.§	1.20
Other fields (see gravity table).	

*All companies. †Humble Oil & Refining Co.; Pure Oil Co. ‡Texas Co. §Gulf Oil Co. Talco by Humble Oil & Refining Co.

West Texas

See gravity table.

Pecos County*	.91
Pecos shallow†	.81

*Shell Petroleum Corp., Gulf Pipe Line Co., and Humble Oil & Refining Co. †Shell Petroleum Corp.

Rocky Mountain States

(Effective January 28, 1937)

Iles, Colo., light*	$1.18
Iles, Colo., heavy*	1.12
Greybull, Wyo.*	1.30
Torchlight, Wyo.*	1.30
Grass Creek, Wyo., light*†	1.30
Grass Creek, Wyo., heavy (Nov. 4, 1936)*†	.62
Hamilton Dome, Wyo. (Jan. 1, 1937)*	.67
Elk Basin, Wyo., light*†	1.30
Frannie, Wyo., heavy*	.62
Frannie, Wyo., light	.70
Hogback, New Mex. (Jan. 1, 1937)*	1.21
Pondera, Mont. (Jan. 26, 1936)*	1.05
Salt Creek Dutton Creek and Midway, Wyo., take Stanolind's Oklahoma prices on a gravity basis.	
Big Muddy, Wyo.†‡	1.18
Rock Creek, Wyo.†	1.20½
Lea County, N. M. (see West Texas gravity table)	
Artesia, N. Mex. (Jan. 28, 1937)‡	.90
Maljamar, N. Mex. (Jan. 28, 1937)‡	.90
Canon City and Florence, Colo.	1.10
Lance Creek, Wyo.	.97
Sunburst, Mont. (Nov. 16, 1937)†	.90
Cat Creek, Mont. (Jan. 1, 1938)‡	$1.30
Cut Bank, Mont. (Oct. 25, 1937), (posted by Northwest Refining Co.)	1.10
Garland, Wyo. (Jan. 1, 1937)†	.80

*Stanolind Oil & Gas Co. †Ohio Oil Co. ‡Continental Oil Co. Cut Bank by Toronto Pipe Line Co.

Southwest Texas

(January 28, 1937)

Pettus	1.37
Salt Flat, Darst Creek, Hilbig, Carroll, Clark, Zoboroski	1.09
Luling	1.00
Lytton Springs	1.12

Saxet and Taft take same gravity table as Gulf Coast.

North Louisiana and Arkansas

Smackover, all grades	$ .90
Tulios and Urania	1.02
El Dorado East field	.90
Union County, Ark.	.90
Ouachita County, Ark.	.90
Lisbon, La. (Dec. 13, 1937)*	.98

*Caddo Crude Oil Purchasing Co.

Gulf Coast

(January 28, 1937)

Choctaw and Darrow, La. See note below	
Clay Creek, Tex.	$1.00
Garden Island, La.	1.37
Cleveland, Tex.	1.27
Hardin, Tex.	1.15
Lafitte, La.	1.24
Livingston, Tex.	1.27
Welsh, La.	.98
Tepetate (La.) (Jan. 28, 1937)	1.24

Duval, Jim Hogg, Webb and Zapata counties, Texas, and Heyser and Placedo fields take Mirando gravity prices. Jennings, La., 5 cents lower than Gulf Coast prices on each degree. Segno, Texas, takes Gulf Refining Co.'s Gulf Coast prices. Choctaw and Darrow, Louisiana, posted for first time by Standard Oil Co. of Louisiana, start below 21 degrees at 90 cents, with 3-cent differential up to 25 gravity, then 2-cent differential up to 40 and above, $1.36. Effective October 1, 1937, Stanolind Oil & Gas Co. in Evangeline, La., pays 92 cents for below 20 gravity, adding 2 cents for each degree upward to 40 and over, at $1.34.

Middle Western States

OHIO OIL CO.
(Effective January 28, 1937)

Lima	$1.25
Illinois	1.35
Princeton, Ind.	1.35
Midland, Mich. (Jan. 5, 1938)*	1.12
West Branch, Mich (Dec. 29, 1937)†	.80
Buckeye (Jan. 8, 1938)	1.09½
Arenac, Mich (Dec. 29, 1937)†	.80
Muskegon, Mich.	1.00
Eastern Kentucky:	
Big Sandy River	1.42
Kentucky River	1.50
Western Kentucky	1.40

*Posted by Pure Oil Co.
†McClanahan P. L. & Simrall
Midland, Mich., price posted by Simrall Corp. and Pure Oil Co. includes Greendale, Porter, Beaverton, Crystal and equal grades. West Branch and Arenac by Simrall Corp. Eastern Kentucky crude purchased by Ashland Refining Co., Ashland, Ky. Buckeye posted by Simrall Corp. and Pure Oil Co.

Eastern States

TIDE WATER ASSOCIATED OIL CO.
(Effective December 1, 1937)

Bradford, Pa.	$2.20
Allegany, N. Y.	2.20

SOUTH PENN OIL CO.
(Effective December 1, 1937)

Pennsylvania Grade Oil in National Transit Lines (Bradford field)	2.20
Pennsylvania Grade Oil in Southwest Pennsylvania Lines	1.88
Pennsylvania Grade Oil in Eureka Pipe Line lines	1.82
Pennsylvania Grade Oil in Buckeye Pipe Line lines	1.70
Corning Grade Oil in Buckeye Pipe Line Co.'s lines	1.27

PENNZOIL CO.
(Effective December 1, 1937)

Pennsylvania Grade Oil in National Transit Lines:	
Group A	2.15
Includes Cochran, Franklin, Hamilton and Doolittle districts.	
Group B	2.14
Includes Tidioute district.	
Group C	2.13
Includes Turkey and Tidioute districts.	
Group D	2.12
Includes Bear Creek and Porkey districts.	
Group E	2.10
Includes Eldeneau, Bull Creek, Rough Run, Carbon, Dipner, Bredlin, McJunkin, Jameson, Kenerdell, Emlenton, Tiona, Lacey and Kinzua districts.	

PURE OIL CO.
(Effective December 1, 1937)

Cabin Creek, W. Va.	1.82
Bradford Hollow, W. Va.	1.82
Kelly Creek, W. Va.	1.82

Canada

Ontario (Sept. 9, 1933)*

Petrolia	$2.19
Oil Springs	2.17

TURNER VALLEY NAPHTHAS AND CRUDE OIL
(January 5, 1938, by Imperial Oil, Ltd.)

Clear naphtha and discolored naphtha, 65 gravity and higher	$2.14
Discolored naphtha and crude oil 40-40.9 gravity	1.14
Increasing 2 cents for each degree gravity with top price for 64-64.9 gravity	1.62

These prices f.o.b. producers field tankage.

*Imperial Oil, Ltd.

Mexico

Heavy Mexican crude	$.86

*In U. S. currency, f.o.b. ship, based on November spot market transactions.

Rocky Mountain Runs

Production estimates for week ended January 15:

	Bbls.
WYOMING	
Salt Creek	15,970
Big Muddy	1,310
Badger Basin	250
Black Mountain	140
Byron	1,260
Dallas Derby	570
Dutton Creek	60
Elk Basin	20
Frannie	790
Garland	2,490
Grass Creek	400
Hidden dome	210
Hudson	300
LaBarge	1,130
Lance Creek	11,790
Lost Soldier	1,480
Medicine Bow	4,370
Midway	40
Oregon Basin	2,170
Osage	800
Pilot Butte	20
Quealy dome	870
Rock River	2,460
South Casper	500
Poison Spider	290
Teapot	20
Warm Springs	70
Wertz	440
Waugh dome	250
Total Wyoming	50,470
MONTANA	
Border	20
Cat Creek	620
Cut Bank	7,770
Dry Creek	850
Kevin-Sunburst	3,830
Pondera	1,110
Total Montana	14.200
COLORADO	
Florence	170
Fort Collins and Wellington	250
Iles dome	2,760
Moffat	430
Orchard	30
Rangely	90
Tow Creek	140
Price	660
Total Colorado	4,530
NEW MEXICO	
Cooper	5,230
Eaves	1,020
Eunice	27,640
Hardy	1,650
Hobbs	15,970
Jal	1,290
Langlie	3,130
Lynch	660
Lynn	520
Mattix	2,640
Monument	29,480
North Lynch	60
Penrose	4,610
Rhoades	140
Skelly	1,790
South Eunice	2,550
Vacuum	330
Artesia-Maljamar	7,170
Getty	200
Hogback	200
Rattlesnake	790
Table Mesa	100
Total New Mexico	107,170
Total Rocky Mountain region	176,370

L. A. Ogden, division petroleum engineer for Pure Oil Company, Fort Worth, Tex., is in a hospital in that city recovering from an appendectomy.

Crude Prices by Gravities

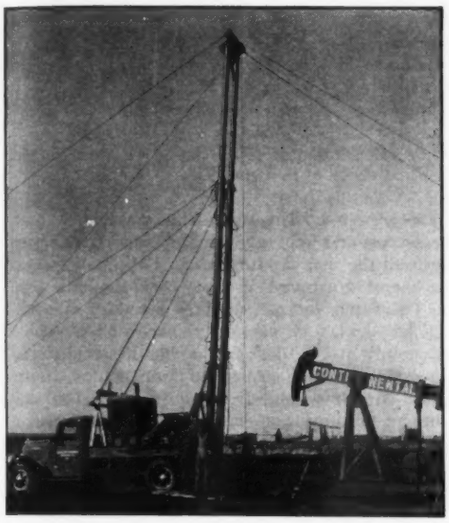
	Oklahoma-Kansas	Oklahoma-Kansas	North and Central Texas	East Central Texas (Mexia district)	North Louisiana-Arkansas	Gray County, Texas	Hutchinson-Carson counties, Texas	Rodessa, Louisiana-Texas and Panola County, Texas	Conroe, Tomball, Raccoon Bend, (Deep) Satsuma	Gulf Coast	Gulf Coast	Lea County, N. Mex. West Texas except Pecos County	Mirando district, Texas	Marion County, Texas	Refugio, Greta, Saxet, Taft, Texas	Anahuac, Flour Bluff, Dickson, Turtle Bay	White Castle, Louisiana	Iowa, Louisiana	Cayuga, Texas
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Bel. 18	....	....	....	....	....	....	....	....	....	$.90	....	....	....	....	....	....	....	$.90	....
18-18.9	....	....	....	....	....	....	....	....	....	.92	....	....	....	....	....	....	....	.92	....
19-19.9	....	....	....	....	....	....	....	....	....	.94	....	....	....	....	....	....	$.94	.94	....
20-20.9	....	....	....	....	....	....	....	....	....	.96	$.95	....	$.96	....	$1.01	....	.96	.96	....
21-21.9	....	....	....	....	....	....	....	....	....	.98	.98	....	.98	....	1.03	....	.98	.98	....
22-22.9	....	....	....	....	....	....	....	....	....	1.01	1.01	....	1.00	....	1.05	....	1.01	1.01	....
23-23.9	....	....	....	....	....	....	....	....	....	1.04	1.04	....	1.02	....	1.07	....	1.04	1.04	....
24-24.9	....	....	....	....	....	....	....	....	....	1.07	1.07	....	1.04	....	1.09	....	1.07	1.07	....
Bel. 25	....	$.98	....	....	$.90	....	....	$.93	....	....	....	....	....	$.90	....	....	....	....	$.88
25-25.9	....	1.00	....	....	.92	....	....	.95	....	1.10	1.10	$.78	1.06	.92	1.11	....	1.10	1.10	.90
26-26.9	....	1.02	....	....	.94	....	....	.97	....	1.13	1.13	.80	1.08	.94	1.13	....	1.13	1.13	.92
27-27.9	....	1.04	....	....	.96	....	....	.99	....	1.15	1.15	.82	1.10	.96	1.15	....	1.15	1.15	.94
28-28.9	....	1.06	....	....	.98	....	....	1.01	....	1.17	1.17	.84	1.12	.98	1.17	....	1.17	1.17	.96
Bel. 29	$1.06	....	$.96	$1.03	....	....	....	....	$1.20	....	....	....	....	....	....	....	....	....	....
29-29.9	1.08	1.08	.98	1.05	1.00	....	....	1.03	1.22	1.19	1.19	.86	1.14	1.00	1.19	....	1.19	1.19	.98
30-30.9	1.10	1.10	1.00	1.07	1.02	....	....	1.05	1.24	1.21	1.21	.88	1.16	1.02	1.21	$1.16	1.21	1.21	1.00
31-31.9	1.12	1.12	1.02	1.09	1.04	....	....	1.07	1.26	1.23	1.23	.90	1.18	1.04	1.23	1.18	1.23	1.23	1.02
32-32.9	1.14	1.14	1.04	1.11	1.06	....	....	1.09	1.28	1.25	1.25	.92	1.20	1.06	1.25	1.20	1.25	1.25	1.04
33-33.9	1.16	1.16	1.06	1.13	1.08	....	....	1.11	1.30	1.27	1.27	.94	1.22	1.08	1.27	1.22	1.27	1.27	1.06
34-34.9	1.18	1.18	1.08	1.15	1.10	....	....	1.13	1.32	1.29	1.29	.96	1.24	1.10	1.29	1.24	1.29	1.29	1.08
Bel. 35	....	....	....	....	....	$.96	$.91	....	....	....	....	....	....	....	....	....	....	....	....
35-35.9	1.20	1.20	1.10	1.17	1.12	.98	.93	1.15	1.34	....	1.31	.98	1.26	1.12	1.31	1.26	1.29	1.29	....
36-36.9	1.22	1.22	1.12	1.19	1.14	1.00	.95	1.17	1.36	....	1.33	1.00	1.28	1.14	1.33	1.28	1.29	1.29	....
37-37.9	1.24	1.24	1.14	1.21	1.16	1.02	.97	1.19	1.38	....	1.35	1.02	1.30	1.16	1.35	1.30	1.29	1.29	....
38-38.9	1.26	1.26	1.16	1.23	1.18	1.04	.99	1.21	1.40	....	1.37	1.04	1.32	1.18	1.37	1.32	1.29	1.29	....
39-39.9	1.28	1.28	1.18	1.25	1.20	1.06	1.01	1.23	1.42	....	1.39	1.06	1.34	1.20	1.39	1.34	1.29	1.29	....
40,over	1.30	1.30	1.20	1.27	1.22	1.08	1.03	1.25	1.44	....	1.41	1.08	1.36	1.22	1.41	1.36	1.29	1.29	....

Column 1—Companies posting are Barnsdall, Bell, Champlin, Continental, Cushing, Derby, Bay, Eason, El Dorado, Cities Service, Falcon, Globe, Gulf, Johnson, Kanotex, National, Phillips, White Eagle, Stanolind, Sunray, Texas, Sun Vickers and Wilcox.
Column 2—Anderson & Prichard, Carter, Cosco, Deep Rock, Magnolia, Mid-Continent, Pure, Rock Island, Shell, Sinclair, Skelly and Tide Water.
Column 3—All purchasers.
Column 4—Humble Oil & Refining Co. and Sinclair Oil Purchasing Co.
Columns 5, 6, 7 and 8—All purchasers.
Column 9—Humble Oil & Refining Co. and Sun Oil Co. Tidewater Oil Co.'s schedule starts at 35 degrees, $1.34 with 2-cent spread up to 40 and over at $1.44. (Raccoon Bend prices are for deep sand oil.)
Column 10—The Texas Co. (Gulf Refining Co. pays same prices up to and including 34 gravity, but continues its 2-cent spread up to 40 and over at $1.41.)
Column 11—Humble Oil & Refining Co., Sinclair Prairie Oil Marketing Co., Sun Oil Co.
Column 12—All purchasers.
Column 13—All purchasers (effective July 6, 1937).
Column 14—Magnolia Petroleum Co.
Column 15—Humble Oil & Refining Co. (effective July 6, 1937).
Column 16—Humble Oil & Refining Co.
Columns 17 and 18—Shell Petroleum Corp.
Column 19—Tide Water Oil Co.

NEW OR IMPROVED EQUIPMENT

Wilson Collapsible Mast-Pole Services Deeper Oil Wells

The new double collapsible mast-pole recently developed by Wilson Manufacturing Co., Wichita Falls, Tex., is designed to fill a long-needed oil-



well servicing requirement, as it can handle wells 4,000 feet deep, equipped with 2½-inch A.P.I. tubing.

This mast is made of 6⅝-inch and 5⅞-inch seamless pipe, and when extended to full height it is 50 feet high. It easily can be raised over a well in 15 to 20 minutes, the manufacturers say. The mast is equipped with three special alloy steel sheaves running on heavy-duty Hyatt roller bearings, alemite-lubricated.

The new pole can be mounted on practically any type or size of Wilson winch now in use or on new winches purchased.

Bulletins, Booklets and Other Literature for the Trade

No-steam-cost condensing turbine-driven charging-pumps are the subject of the December Newsletter, published by Byron Jackson Co., Los Angeles, Calif.

The Billings & Spencer Co., Hartford, Conn., announces a pocket-size catalog describing and illustrating its line of merchandise forged tools, featuring the new line of Vitalloy wrenches.

Two bulletins, one on a new gas-engine-driven 200-ampere welder and one on a new heavy-duty gas-engine-driven welder, are announced by Hobart Brothers Co., Troy, Ohio.

Under the heading, "How I Did It" the newest number of the Welder's Stabilizer, published by the Lincoln Electric Co., Cleveland, Ohio, offers several pages of helpful ideas for welders.

A 12-page illustrated bulletin on natural-gas engines for industrial power is being distributed by Enterprise Engine Co., San Francisco and Los Angeles.

Purchasing agents will find use for the reference booklet, "Acco Products," issued by the American Chain & Cable Co., Inc., Bridgeport, Conn. It indexes over 200 products, gives a breakdown of Acco divisions and the products manufactured by each, with a list of sales offices and warehouses.

The current number of Monsanto Current Events, published by Monsanto Chemical Co., St. Louis, Mo., contains among its articles one which discusses the problem of slime and algae control in heat-transfer systems.

How the oil industry invests $4,000,000 in welded tanks is the subject of an article in the December-January number of the Wyatt Way, published by Wyatt Metal & Boiler Works, Dallas and Houston, Tex.

A bulletin of interest in the oil fields has been issued by the Sullivan Co., Memphis, Tenn., on lost circulation, drilling, heaving shale or cavey formations, drilling-muds and elimination of paraffin in pumping wells.

Two new pieces of literature have been prepared by Brown Instrument Co., Philadelphia, Pa., one a folder, "Legibility Plus Precision," and the other a catalog of the Brown automatic boiler-regulation system.

Motor Trucks in the Oil Industry

More than 140,000 motor trucks are owned and operated by the oil industry to transport drilling, pumping, pipe line, refinery, natural-gasoline plant and filling-station equipment and to transport crude oil and refined products, according to a well-written story of oil in the current issue of Timken News, published by Timken-Detroit Axle Co., Detroit, Mich. Next to the largest motor-truck fleet in the United States is owned by Standard Oil Co. of New Jersey, and there are 12,000 units in it. At least 13 oil companies have fleets of 1,000 or more trucks. Pictures tell something of the part played by Timken two-speed axles in the operation of these trucks.

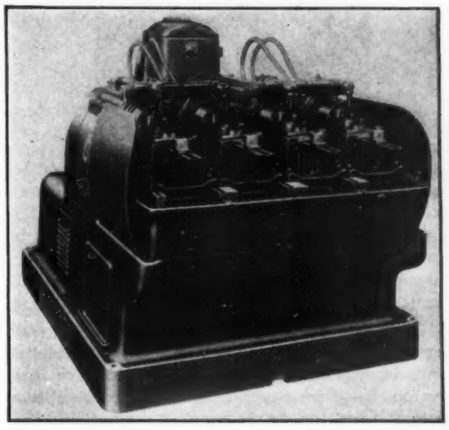
Hercules Pumps in Louisiana

Eleven pumps powered by Hercules HXB 5-by-6-inch special oil-field units are now in serv-

ice for the Standard Oil Co. of Louisiana, according to officials of the Hercules Motors Corp., Canton, Ohio. Six 5-by-10 Gaso duplex pipe-line pumps are in operation at Zilks No. 1 station, at Rodessa, La. One of these, with an operating pressure of 600 pounds, at 56 strokes per minute and with the engine operating at 1,200 r.p.m., moves approximately 5,000 bbls. of oil every 24 hours. The five others, Gardner-Denver 5-by-10 pumps, are installed at newly built stations in the Louisiana territory.

Quadruple Threading Device Is New Landis Development

The Landis Machine Co., Inc., Waynesboro, Pa., announces a new threading machine to supplement its line of thread-cutting die-heads and threading machines. The quadruple Landis possesses distinctive features designed to assure accuracy and to



increase production possibilities. It is unusually flexible and handles bolts of any length from one-quarter to three-quarters inch in diameter. The maximum thread length that can be cut is 3½ inches.

The four-spindle Landis threading machine is of the semiautomatic type, in which the movement of the die-head spindles and the opening of the grips are actuated by cams. The operating cycle reduces the manual labor to merely placing and removing the work from the grips.

The four die-head spindles are closely coupled, making it unnecessary for the operator to move from one position to place the work in any pair of grips. The cycle of the machine is controlled from a fully enclosed pick-off type gearbox located at the rear. The gear train is compact in design and sturdily constructed. All gears that operate at high speeds are cut from 1045 S.A.E. steel and are heat-treated. All gear-shaftings are bushed. The gear-train drives the cam-shafts and cams which actuate the die-head spindle travel and grip movement as well as the rotation of the die-head spindles with the result there is perfect syncronization at all times.

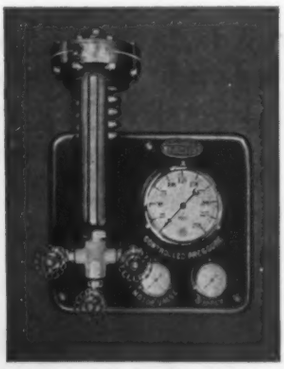
One of the most important features is the method by which the die-head is started on the work. The die-head spindle, mounted on anti-friction bearings, has both a rotary and sliding action in its housing. The forward movement is actuated by a spring which moves the die-head under a heavy starting pressure, until one or two threads are cut, after which a lighter or follow-up pressure is applied and exerted for two or three threads. The starting springs are adjustable to suit threads of different pitch and various materials and assure a perfect thread at all times.

New Asbestos Sheet Packing

B. F. Goodrich Co., Akron, Ohio, has announced a new addition to its line of compressed asbestos sheet packing known as type 72. Black in color with graphite mixed throughout, this new packing is recommended for temperatures above 212° F. where gaskets are in contact with oil or solvent vapors.

Pressure Controller Designed to Give Positive Regulation

The Syncromaster pressure controller, recently announced by the Mason-Neilan Regulator Co., Boston, Mass., is a simplified combination of pilot mechanism and a diaphragm-actuated con-



trol valve of advanced design. The unit was developed to improve control and to reduce installation and maintenance costs by eliminating the inconvenience and potential trouble inherent in old-style combination regulators. Stable and accurate control is obtained because of the full throttling features of pilot and control valves.

Operation is hydraulic, using any external supply of 20 to 150 pounds pressure. Since the pilot bleeds only when the control-valve diaphragm pressure is reduced, water consumption is low, resulting in economical operation. The controlled pressure is piped to the pilot valve diaphragm and is balanced by the setting of the springs.

The Syncromaster may be used anywhere accurate, positive regulation is required. A variety of standard pressure ranges are available between 1 and 265 pounds. Special ranges up to 750 pounds are also available. Typical applications include primary and auxiliary steam lines; heating and evaporating systems; turbine or bleeder make-up systems; desuperheating service; differential pressure systems and pump regulation.

Here and There With Men Who Manufacture Equipment

H. L. Duncan, in charge of Unibolt sales for Thornhill-Craver Co., Houston, Tex., in the West Texas-New Mexico area, with headquarters in Midland, Tex., has been transferred to Wichita Falls, Tex. He is succeeded in Midland by W. P. Knight. Kenneth Craver, of Houston, is visiting California oil fields, accompanied by Lester Peck, the company's California sales representative.

Hill, Hubbell & Co., division of General Paint Corp., Cleveland, Ohio, has added Ralph A. Arvesen to its sales engineering staff. Mr. Arvesen was formerly assistant superintendent of maintenance and construction for Boston Consolidated Gas Co.

Charles E. Wilson, of Bridgeport, Conn., vice president in charge of General Electric's appliance and merchandise department since 1930, has been elected executive vice president, a new position. Philip D. Reed was made assistant to the president.

Harnischfeger Corp., Milwaukee, Wis., has appointed Abbott F. Riehle sales manager of the Smootharc welder and welding electrode division.

Over 2,000 Kansas oil men were the guests at the American Iron & Machine Works Co.'s old-fashioned barbecue given in Great Bend, Kans., recently to mark the opening of American's new branch house there.

K. M. Schaefer has been made general sales manager in charge of all domestic sales and advertising activities of Federal Motor Truck Co., Detroit, Mich. He joined Federal recently as assistant to the general manager.

Laminated Shim Co., Inc., Long Island City, N. Y., has appointed Industrial Sales and Engineering Co., Houston, Tex., exclusive agent in the southwest for the sale of Laminum and other types of shims.

Edwin A. Wert, of Detroit-Edison Co., has been retained by the power piping division of Blaw-Knox Co. as consulting engineer.

Polished Rod Unites Economy With Corrosion-Resistance

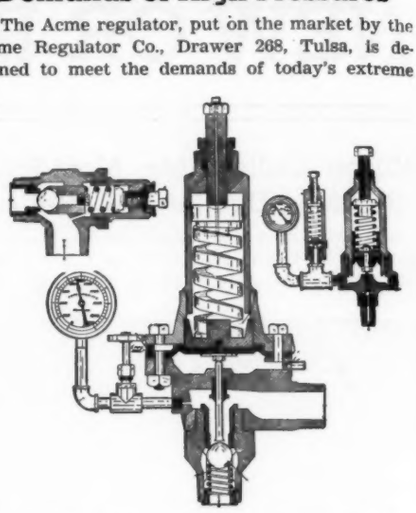
Another development in covered materials has been applied to commercial advantage in the form of alloy steel rods with an outer jacket of monel. This combines the economy and strength of steel with the corrosion and wear resistance of high nickel-copper alloys. The covered rod, developed by the Metal Forming Corp., Elkhart, Ind., is formed by inserting a steel core in a welded jacket of monel. The weld is rough-ground and the covered tube then is drawn through dies to effect reduction in diameter. This drawing operation gives a high finish to the monel cover and makes the contact between the cover and the core so tightly adherent as to be permanent.

The covered rod was developed for polished-rod service in the oil fields. In the sour oil fields of Texas and Oklahoma a solid-monel polished rod recently was removed after four and one-half years of service and found to be still in highly usable condition. Life of unprotected steel rods in the same fields averaged between 15 and 90 days. The first cost of solid-monel rods tends to limit their use, notwithstanding their performance value.

Like the solid rods, the covered units offer high strength, resistance to corrosion by brines, crudes, and hydrogen sulfide, abrasion resistance, and a smooth surface which saves packing. They are available from stock in diameters of 1⅛ and 1¼ inches and in lengths of 11 and 15 feet. Greater lengths and larger diameters have been produced on special order.

Acme Regulator Designed for Demands of High Pressures

The Acme regulator, put on the market by the Acme Regulator Co., Drawer 268, Tulsa, is designed to meet the demands of today's extreme



rock pressures. This unit will master all high pressures and will give any downstream range desired, the manufacturers say. It is made of extra-heavy gun-metal bronze, 6,000 pounds test.

The valve and orifice are a standard oil-country ball and seat, easy to replace and available at supply stores. The ball valve in service has an oscillating and rotating motion, which diminishes wire-draw and freezing hazards. The diaphragm housing is so constructed that diaphragm blowouts are eliminated. The regulator is spring-loaded for downstream control up to 300 pounds. Pilot control will give any downstream range desired. One back-pressure valve, included as regular equipment, provides step reduction of high pressures, which is an aid in eliminating freeze and wire draw at valve parts.

Buys Into Moore Steam Turbine

Worthington Pump & Machinery Corp. Harrison, N. J., has acquired an interest in Moore Steam Turbine Corp., Wellsville, N. Y. This adds to the list of products sponsored by Worthington an extensive line of steam turbine equipment and in turn provides Moore with the benefit of Worthington's resources in matters pertaining both to application and metallurgy.

O'BANNON SALES MEETING FOLLOWED BY BANQUET

The annual sales conference of Walter O'Bannon Co., Tulsa, lasting two days, was held re-

cently. Discussions of the coming year's program were followed by a banquet for the sales representatives and other employes of the organization.

In foreground: H. D. Smith, Borger, Tex.; E. W. Jacobia, Tulsa; Dewey Nichols, secretary-treasurer, Tulsa; H. P. Gillespie, Odessa, Tex.; W. J. Hennigan, Hutchinson, Kans.; C. M. Peters, Gladewater, Tex.; Blake Caldwell, Tulsa. Seated in background: Karl Kretchmar, Tulsa; L. B. Rowsey, Houston, Tex.; R. L. Hodshire, Kilgore, Tex.; F. H. Krug, Shawnee, Okla.; R. H. Oldham, Henderson, Tex.; Dick Smith, Tulsa. Standing: E. B. Beard, El Dorado, Ark.; C. E. Neil, Tulsa; Ray Allen, Tulsa; E. P. Oldham, Los Angeles, Calif.; Otto Weissner, Tulsa; Walter O'Bannon, Jr., Tulsa, and Walter O'Bannon, president, Tulsa.

One-Piece Asbestos Suit Gives Added Protection at Fires

Johns-Manville has developed a one-piece asbestos suit offering new features for the protection of fire-fighters. With the shoes and body of the garment all in one piece, the suit is an improvement over the former jumper-and-jacket type, since in an emergency it can be put on quickly by simply closing the zipper fastener up the front. Protected from heat by a special asbestos flap, the zipper also permits a man to be removed from the suit quickly in the event that he is overcome by heat. The suit permits a maximum freedom of action.

The oil and chemical industries, airports and fire departments are subject to emergencies in which the asbestos suit provides the most effective means of fighting fire and carrying on rescue work. For rescuers who take grave risks in attempts to save human life, Johns-Manville has attached a safety-hook to the belt line of the new suit, and to this hook a flexible steel cable can be attached to pull the rescuer away from a fire if he is overcome by heat.

Another feature of the new suit is the heat-proof glass which is suspended from the visor of the hat and therefore stands clear of the face. Also, since the suit is made in one piece, the possibility of losing or misplacing necessary parts of the equipment is lessened.

New Ford "One-Tonner" Built for Widest Use in Its Field

A new unit, the "one-tonner," features the 1938 expanded line of Ford V-8 trucks and commercial cars announced by the Ford Motor Co. Intended for widest possible use in the one-ton field, the unit is available in several body types. The entire range of new 1938 units includes four wheelbase lengths, constituting the most diversified line of trucks and commercial cars in the company's history.

A new treatment of the radiator grille gives the front end a more massive, impressive appearance, heightened by long louvres extending horizontally along the sides of the hood. The hood is hinged at the cowl and lifts at the front. It is held down securely by a locking device which serves also as a radiator ornament.

New-style headlamps with brackets faired into the one-piece front fenders add a distinctive touch to the front-end assembly. The fenders have rolled edges underneath and are supported by

heavier braces. New "straight line" running-boards are lower.

Cab interiors are fully lined with embossed veal grain "art leather." Cab doors are better sealed against outside weather and cab headroom has been increased 3 inches.

New, easier-to-read figures are used in the instrument panel. The instruments have been restyled and regrouped. The dispatch box has a new type door which permits installation of clock and lock. Hardware is of the same type used on standard passenger cars. There is a foot-operated switch for headlight beam control with an indicator light on the instrument panel.

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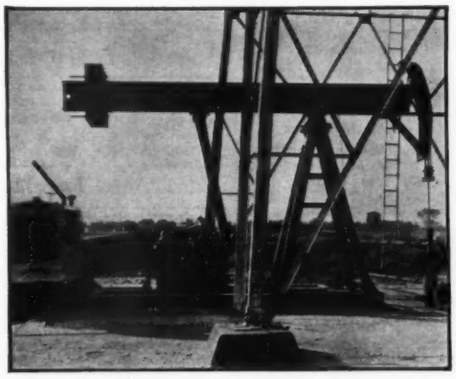
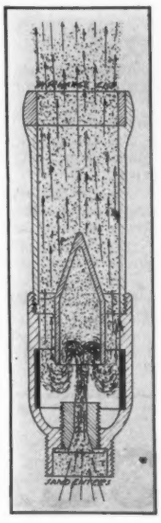


"Caterpillar" engine driving an Oilwell SC-20 pumping unit with extended base at Haven, Kans.

Cleaner Surfaces Gained With Michiana Sand-Blast Gun

A new sand-blast gun now is being manufactured by the Michiana Products Corp., Michigan City, Ind., which incorporates features of design and principle said to provide better surfaces for painting and finishing wood and steel in much less time and without injury to the surfaces of the materials. Exclusive license agreement for the manufacture and sale of this gun has been made with Frederick W. Schultz, superintendent of the shop of the Atchison, Topeka & Santa Fe Railroad, Wichita, Kans., the inventor. The gun has been employed for several years in cleaning wood refrigerator and steel-sheathed cars preparatory for refinishing, and is connected to any 80- to 100-pound air line.



This gun, as the accompanying sketch shows, has a chamber in which the sand meets a baffle. This sets up a whirling motion, reducing the sand particles and increasing the number of cutting edges. Sand is delivered under pressure through a flattened orifice fitted with abrasive-resistant alloy steel lips. The result is a flat stream of sand expelled under uniform pressure. It is claimed that this design permits the use of lower-cost sand, removes grime, grease and old finishes faster, and reduces buckling to a minimum on light materials without cutting or pitting the surfaces. Microphotographs show a smooth, clean surface.

Bradford Supply in K. M. A. Field

Bradford Supply Co., Bradford, Pa., has opened a branch store at Kadane Corner in the new K.M.A. field of Texas. A complete line of oil-field equipment and contractors' supplies will be carried. The district office for Bradford Supply is in Wichita Falls, Tex., with H. H. Rutter manager.

Lane-Wells Bonuses

Presents and cash bonuses recently were distributed to more than 387 employes of Lane-Wells Co., Los Angeles, Calif. Bonuses amounting to $75,000 were distributed on the basis of length of employment and rate of income.

LARKIN PACKER SALESMEN DISCUSS PROGRAM FOR YEAR AT ST. LOUIS, MO., MEETING

A wide range of topics was discussed at the recent annual sales meeting of Larkin Packer Co., Inc., St. Louis, Mo. The sales and sales promotional program for the coming year was submitted for general comment. A dinner at the Jefferson Hotel, with an entertainment program, was a feature. In addition to the visiting salesmen there were 20 office employes at the dinner. The accompanying picture shows 136 employes. The company grew from a small shop to one of the important manufacturing concerns for the oil country.

Oil Man's Calendar

January

24—Hot Springs, Ark. Governor Marland's Petroleum Conservation Conference of Oil State Governors.

24-25—Minot, N. D., Northwest Petroleum Association, North Dakota Division.

27-28—Minneapolis, Minn., Northwest Petroleum Association, Minnesota Division, Hotel Radisson.

28—Pittsburgh, Pa. Annual dinner, Pittsburgh Traffic Club, William Penn Hotel.

February

3-4—Lubbock, Tex. Third Welding Conference, Texas Technological College.

7-9—Louisville, Ky., Kentucky Petroleum Marketers Association, Brown Hotel

14-15—Wichita, Kans. Kansas Oil Men's Association, twenty-fourth annual convention, Hotel Broadview.

14-18—New York, American Institute of Mining and Metallurgical Engineers, annual meeting, Engineering Societies Building.

17-18—Amarillo, Tex. American Petroleum Institute, Division of Production, spring meeting, Herring Hotel.

22-24—Milwaukee, Wis. Wisconsin Petroleum Association, Schroeder Hotel.

22-24—Columbus, Ohio, Ohio Petroleum Marketers Association, fifteenth annual convention and marketing exposition, Deshler-Wallick Hotel.

March

2-3—Indianapolis, Ind., Indiana Independent Petroleum Association, spring meeting.

7—Rochester, N. Y., American Society for Testing Materials, Spring Regional Meeting and Group Committee Meetings.

16-8—New Orleans, twenty-third annual meeting, American Association of Petroleum Geologists, Roosevelt Hotel.

23-25—Los Angeles, Calif. American Society of Mechanical Engineers.

24-25—Fort Worth, Tex. American Petroleum Institute, Division of Production, spring meeting, southwestern district, Blackstone Hotel.

April

4-6—Cincinnati, Ohio, A.G.A. Distribution Conference, Netherland Plaza.

13-15—Cleveland, Ohio, National Petroleum Association.

13-15—Houston, Tex., Petroleum Industry Electrical Association.

17-21—Dallas, Tex., American Chemical Society.

19—Los Angeles, Spring meeting, Pacific Coast district, A.P.I. Division of Production, Biltmore Hotel.

20-22—Buffalo, N. Y., American Institute Mining and Metallurgical Engineers, Open Hearth Conference.

25-27—Hot Springs, Ark., Western Petroleum Refiners Association annual meeting.

28-29—Pittsburgh, Pa. Spring meeting, Eastern District, A.P.I. Division of Production, William Penn Hotel.

May

11-13—Tulsa. Natural Gasoline Association, Hotel Tulsa.

12-14—Tulsa. National Oil Scouts Association of America.

14-21—Tulsa. International Petroleum Exposition.

23-25—Wichita, Kans. American Petroleum Institute, eighth midyear meeting.

(?)—New Orleans, La. American Gas Association, Natural Gas Department.

June

6—Houston, Tex. Oil Workers International Union.

16-18—Pittsburgh, Pa. Pennsylvania Grade Crude Oil Association.

20-24—St. Louis, Mo. American Society of Mechanical Engineers.

September

14-16—Santa Barbara, Calif., annual meeting Pacific Coast Gas Association, Biltmore Hotel.

CLASSIFIED ADVERTISING

Patent Attorneys

JACK A. SCHLEY
PATENT LAWYER

Patents obtained — infringement practice in all Courts—oil field experience. 1807-11 Tower Petroleum Bldg., Dallas. 2014 Second Nat'l. Bank Bldg., Houston. 707 Insurance Building, San Antonio. 433 Munsey Building, Washington, D. C. Address any of these offices.

PATENTS — TRADE MARKS

All cases submitted given personal attention by members of the firm. *Form "Evidence of Conception" and instructions*
"How to Establish Your Rights"—Free
LANCASTER, ALLWINE & ROMMEL
Patent Law Offices
418 Bowen Bldg. Washington, D. C.

Manufacturers Agents

MANUFACTURERS AGENTS

We invite inquiry for exclusive territorial franchise from responsible, established manufacturers agencies with high caliber sales organizations. For product details see page 106. Submit sales credentials with inquiry.

ALFOL INSULATION CO., INC.
155 East 44th St., New York, N. Y.

Crude Oil Production

RODESSA CRUDE oil for sale from my own and other Miller County, Arkansas, wells. Shipments to be made via KCS Ry. from Layton, La. or Ark., to Lake Charles or New Orleans, La., Beaumont or Port Arthur, Texas. See William Monroe Layton, Rodessa, Louisiana.

Financing

CAPITAL SEEKERS—Put your project before 260 Key-Men. Cost trifling. Details free. AMSTER LEONARD, Fox Theater Building, Detroit, Michigan.

INQUIRIES solicited from corporations interested in raising capital through marketing of corporate securities.
THE BROOKWORTH CO., Inc.,
110 East 42nd St., New York City.

JOHN MORRIS, Box 5411, Philadelphia, writer of some of America's greatest financial campaigns will shape your deal FREE. Prospectus expertly written and list supplied for $25. and low commission. Handle your own mailing. Established 1913.

Incorporations

DELAWARE CHARTERS: Complete service $35. Submitted forms. Chas. G. Guyer, Inc., Wilmington, Delaware.

CHARTERS — Delaware best, quickest, cheapest, more liberal. Free forms Colonial Charter Co., Wilmington, Del.

Oil Industry Printing

OIL FIELD LEGAL BLANKS

Leases, assignments, releases, township plat books, well records, etc. Request on your letterhead gets free catalog. Olds Press, 215 East Third St., Tulsa, Okla.

FREE LAYOUTS

on special printing work. Stock certificates, bond issues, legal printing, special advertising letters, circular work of all kinds. Ask us about it. Correspondence solicited.

Specialties Printing Service
506 N. Oakland, Indianapolis, Indiana

Survey Service

OIL, Mining, Industrial, Investigation and Appraisals made, anywhere, at attractive rates, under the Technical Supervision of an experienced and reliable personnel. Brookfield Exploration Co., Milam Building, San Antonio, Texas.

Real Estate

FOR RENT OR SALE—50 by 140 ft. brick building, show room, front and rear truck entrance, wholesale, retail district. Rent reasonable. A. Faustgen, Wooten Hotel, Abilene, Tex.

Royalties

HAVE 390 A. near Pawnee-Barton Co., Kans. producers. Now under lease. Mortgage foreclosed. Will make interesting royalty proposition to party advancing $15,000 for redemption of land. P. O. Box 4771, Station E, Kansas City, Missouri.

WANT production, also royalties. Will drill wildcats and offsets of merit. Submit data complete. Address Box J-192, The Oil and Gas Journal, Tulsa, Okla.

Royalties

NEW MEXICO Oil and Gas Leases as royalties. Send 50 cents in stamps for new State Oil Map of New Mexico. Roy G. Barton, Clovis, New Mexico.

Oil Royalties and Oil and Gas Leases
Bought and Sold
E. T. Marion
1109 Petroleum Building
Midland, Texas.

ROYALTY DEPOSITOR CORPORATION, 70 Pine Street, New York City, are buyers of landowner's producing royalties for a large royalty Investment Trust. Offerings of good properties are invited.

Brokers—Salesmen

Sell in the most active area in the United States—The Permian Basin of West Texas and Southeastern New Mexico. From the standpoint of royalty investors this area has much to offer. Can supply you with choice non-producing royalties located on geophysical highs. Also drilling blocks, close in acreage to production, or wildcat leases. I maintain my own field men who cover this area for me. All offerings meet the requirements of the Security and Exchange Commission. Inquiries invited.

B. D. BUCKLEY
Paul Brown Bldg., St. Louis, Mo.

PRODUCING OIL ROYALTIES
15 years of experience.
L. H. WITWER
214 Kennedy Bldg., Tulsa, Okla.

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma.

Producing and Non-Producing
OIL ROYALTIES
Registered Dealers Only
GRIMES ROYALTY CO.
Hunt Bldg. Tulsa, Okla.

Business Opportunities

DIRECTLY alcoholized, oxygenated, petroleum oils, higher alcohols, motor oils. Samples produced for reasonable fees. Free circular on "New Treatment of saturated hydrocarbons." Dr. Pelc, 2519 So. Crawford Ave., Chicago, Ill.

CLASSIFIED DISPLAY RATES

Classified Display is set with a border and may be used in one or two column sizes.

1 Inch	*1 time*	*$5.00*
1 Inch	*13 times*	*4.50 per inch*
1 Inch	*26 times*	*4.00 per inch*
1 Inch	*52 times*	*3.50 per inch*

This space may be contracted for over a period of one year from the date of the first insertion and is PAYABLE IN ADVANCE, MONTHLY.

CLASSIFIED

Classified advertising rates: First insertion, 35 cents a line; each additional insertion, 25 cents a line, PAYABLE IN ADVANCE. Six words usually make a line. Count as a word each one-letter word and each group of figures. White-space computed at regular line rate. Allow two extra lines for blind ads. Ads of less than three lines not accepted. No formal acknowledgement is made, and proofs cannot be shown in advance of publication.

	1 time	2 times	3 times	4 times		1 time	2 times	3 times	4 times
3 Lines	*$1.05*	*$1.80*	*$2.55*	*$3.30*	*7 Lines*	*$2.45*	*$4.20*	*$5.95*	*$7.70*
4 Lines	*1.40*	*2.40*	*3.40*	*4.40*	*8 Lines*	*2.80*	*4.80*	*6.80*	*8.80*
5 Lines	*1.75*	*3.00*	*4.25*	*5.50*	*9 Lines*	*3.15*	*5.40*	*7.65*	*9.90*
6 Lines	*2.10*	*3.60*	*5.10*	*6.60*	*10 Lines*	*3.50*	*6.00*	*8.50*	*11.00*

We reserve the right to withhold all advertising of questionable character. To avoid delay be sure to send remittance with copy. We will set your ad in the smallest amount of space possible and refund all overpayments. One-time insertions will not be run until fully paid. Forms close MONDAY NOON before each issue date.

THE OIL AND GAS JOURNAL
Tulsa, Oklahoma